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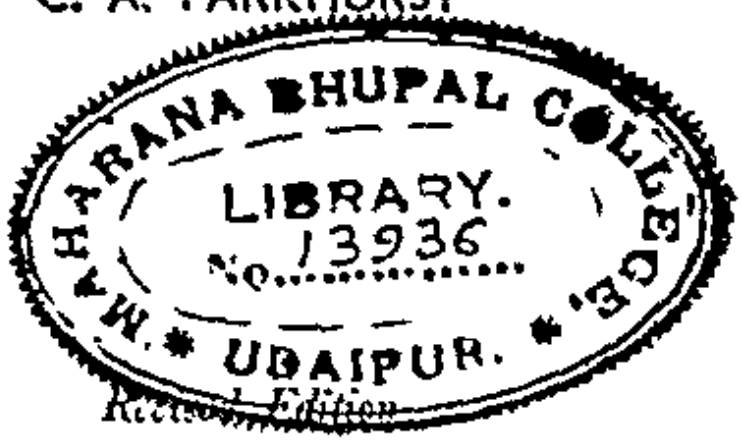

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DEDICATED TO
THE STUDENTS,
CITIZENS
OF THE FUTURE

First Edition, 1942
Reprinted, 1943, 1944, 1945, 1946, 1947
Revised Edition 1949

PRINTED BY G. F. BEST, AT THE I. S. S. D. PRESS,
95 B, CHITTARANJAN AVENUE,
OPPOSITE MEDICAL COLLEGE HOSPITAL, CALCUTTA.

This book has been written at the suggestion of one who is very actively engaged in educational matters, and who knows the requirements of present-day students.

There are many books which deal with the individual subjects in a much fuller and more competent manner, but in making a selection such as is contained in this book, it is not possible to deal with the subjects more fully than has been done. It has been the endeavour of the author to make the contents simple and interesting, and it is hoped that students will enjoy reading *Wonders of the Past and Present.* Who knows how many of them may not be the inventors of still greater wonders in the future !

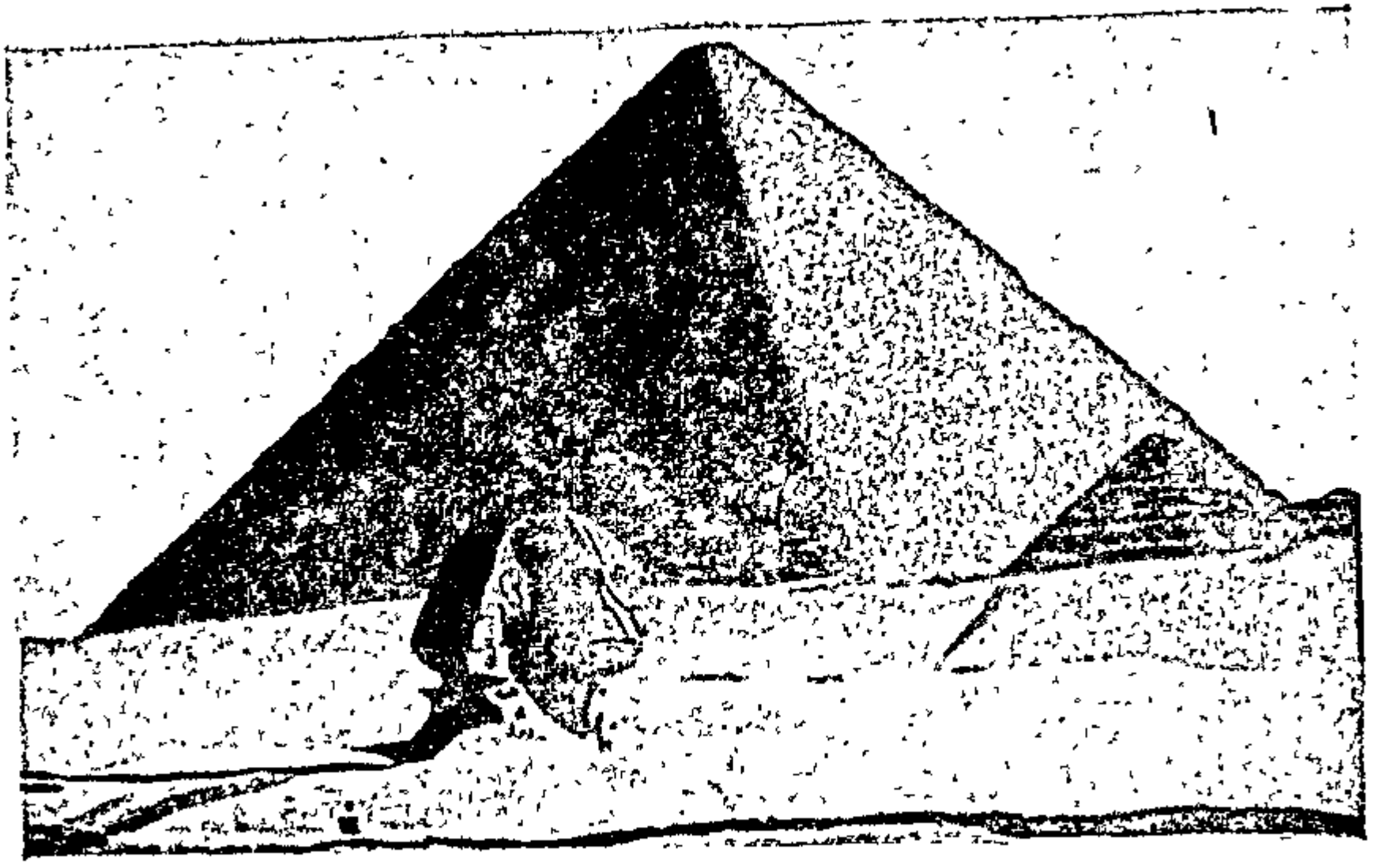
The author offers his best thanks to his educationist friends for their helpful advice. He is also greatly indebted to Mr. T. Mark for his valuable suggestions.

C. A. P.

and directors of labour and assembled huge numbers of slaves to help him in building the Pyramids.

Now, what are the Pyramids? They are tombs, the burying-places of many ancient Egyptian kings and queens. A Pyramid is built of huge blocks of stone. It has triangular sides which meet together in a point at the top. You may well ask how the Egyptians were able to move such large blocks of stone. The question becomes more difficult when we realize that in the Great Pyramid alone over six million tons of stone were used. The stone was quarried on the other side of the Nile. During the annual flooding of the river, the blocks of stone were floated across and then dragged to a slope or inclined road built at the side of the foundations. The stones were then hoisted up this incline to the position required. This was done by thousands of slaves. Such a feat shows that the Egyptians had a very good knowledge of elementary engineering. The Pyramids which were reckoned amongst the Seven Wonders of the Ancient World were the three Pyramids of Gizeh, lying in the desert a few miles from Cairo.

The Great Pyramid is over 450 feet high, and each of its four sides measures 755 feet at its base. The Great Pyramid covers over fifteen acres of land. Herodotus, the famous Greek historian, says that it took one hundred thousand men twenty years to build. When the work was completed the sides of the Pyramid



THE GREAT PYRAMID

A MUMMY

were polished, but nowadays, if you went to see it, you would find that its sides are a series of huge steps up which you can climb. Such a climb would be very tiring, but think of the wonderful view you would get on reaching the summit.

The Great Pyramid is the tomb of King Khufu or Cheops. At the foot of the Pyramid is a passage leading to the central chamber in which the embalmed body (mummy) was placed in a painted mummy-case. The paintings and hieroglyphics on the case and on the walls of the chamber represent the history of the dead king, his sayings, his beneficent acts, and also prayers for the repose of his soul. The mummy-case, with its contents, was placed in a beautifully carved sarcophagus of valuable material, such as marble,

basalt, alabaster, or even of gold. There were often smaller rooms adjoining the central chamber, and in those rooms were placed other dead kings and queens, or articles of furniture and food for the use of the dead on their journey to the Unknown.

The process of embalming a dead body lasted about seventy days. In the case of a king or queen it probably took much longer, as many valuable articles had to be prepared. Later on I will tell you about the wonders which were found in the tomb of King Tutankhamen only a few years ago.

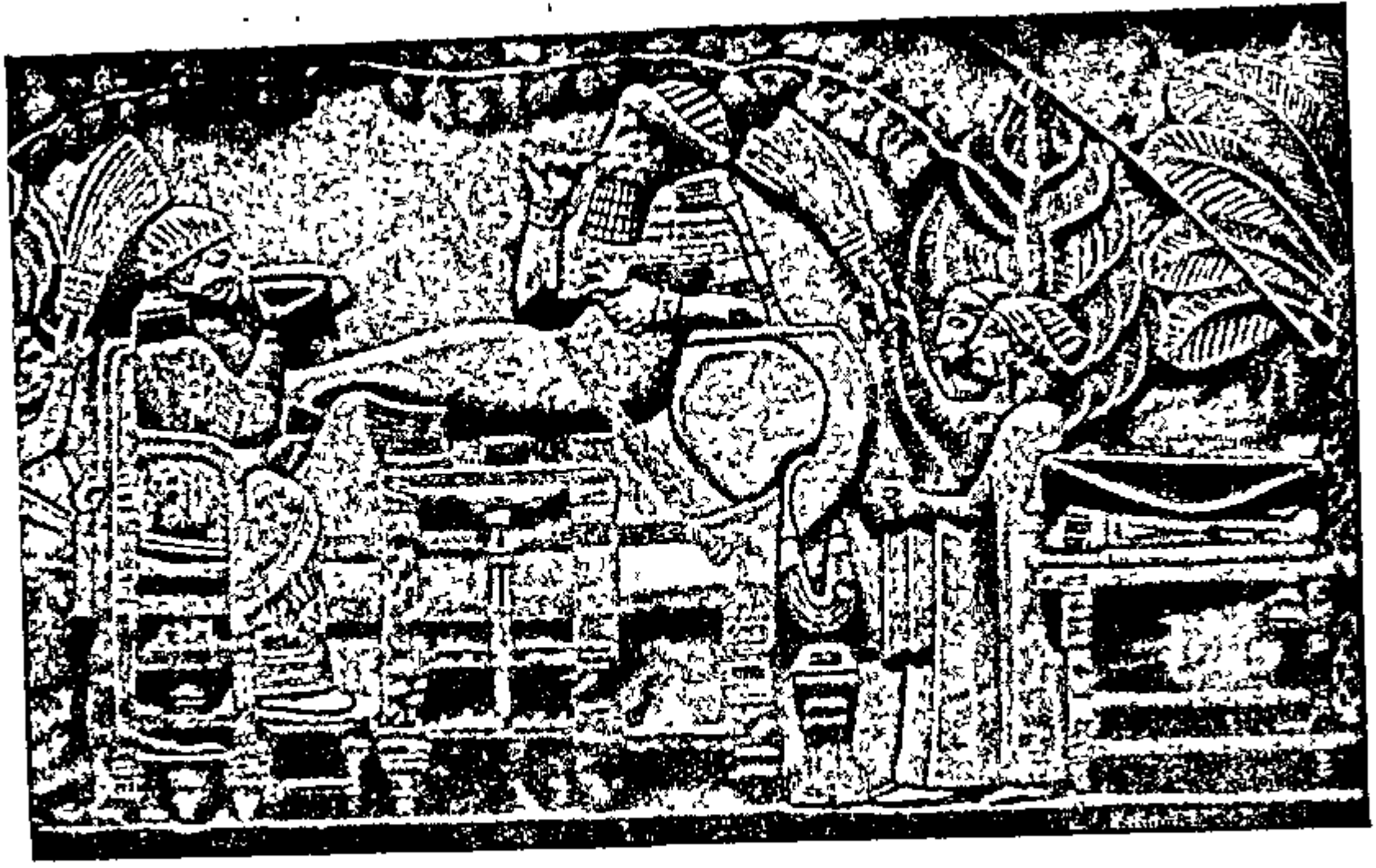
Try to imagine what a magnificent yet mournful sight the funeral of a king must have been. A huge procession would assemble at the palace. In front walked attendants carrying the many objects which were thought to be required by the dead. Beautifully carved furniture, wonderful alabaster jars containing precious ointments, and other jars containing food for the dead, found a place in the procession. Following them came men bearing on their shoulders large chests containing precious jewellery, such as rings, mirrors, diadems, etc. At intervals walked priests reciting prayers for the deceased king, whose beautifully painted mummy-case rested on a couch which was placed on a cart drawn by many white oxen, the whole moving under a silken canopy of exquisite workmanship. Priests surrounded the mummy, swinging censers in which incense burned, the scented smoke filling the

air with a pleasing perfume. Then came the professional women mourners and another body of priests. Last of all would walk the great officers of state and high dignitaries, each in his allotted place. The whole procession moved forward to the cries of the priests, "Proceed in peace, proceed in peace, to the tomb prepared for you." On reaching the Pyramid many religious rites had to be performed, and at last, after a final farewell had been taken by the king's relatives, his body was placed, surrounded by its treasures, in a sealed chamber right in the heart of the immense structure he had reared for himself.

Near the Great Pyramid are two other pyramids known as the Second or Chephren Pyramid, and the Third or Menkaura Pyramid. Near by stands the Sphinx.

The Sphinx is a large stone representation of a lion with a human head. It is carved from solid rock. We do not know exactly when the Sphinx was carved, but it was standing at the time of the Khufu Dynasty (about 3730 B.C.). From the base of the figure to the top of its head, it is 70 feet, and from head to tail it is 150 feet long. This will give you a very good idea of its immense size.

We will now leave the Land of the Nile, and its wonderful history, and consider another country whose story belongs to the dim past—the country of Babylonia. The history of Babylonia has been traced



KING NEBUCHADNEZZAR AND HIS QUEEN IN THE HANGING GARDENS

as far back as 7,000 B.C. Just think for a moment about that fact. It means that 9,000 years have elapsed since a certain temple was built in that ancient land at a place called Nippur. 9000 years! It almost takes one's breath away just to contemplate such a length of time.

It is not possible to tell you much about the chequered history of Babylonia, but you should know something about its last and greatest King Nebuchadnezzar He came to the throne in 605 B.C. and in course of time married Amytis, who came from Media. The capital of his kingdom was Babylon, situated on the plain which is watered by the Rivers Tigris and Euphrates. *It is now part of the modern state of Iraq.* Nebuchadnezzar was determined to make Babylon impregnable, so he built huge solid walls around it and inside them raised buildings of great splendour, Now, although Nebuchadnezzar built such magnificent palaces and did all he could to please his people, the Queen was dissatisfied. When she thought of the hills of her native country and then looked around her at the flat plains surrounding Babylon, she sighed and longed to see her own land once again. Nebuchadnezzar soon saw that his queen was discontented, so he devised an ingenious plan. He built the so-called Hanging Gardens. Arches, resting on hollow pillars of masonry about three hundred feet hight, were erected, and on these arches terraces were built. The

terraces were then planted with shrubs, trees and flowers, and made to represent the hills and valleys of the queen's native country. Fountains and pavilions were also built, and the scene must have been very beautiful. All this was done inside the walls of Babylon. Alas, very little stands to-day of this capital city of a mighty empire, though the great statues and other relics to be seen in the world's museums show what its splendours must have been.

DIANA OR ARTEMIS

We have now made two excursions into the ancient world—to Ancient Egypt and to Ancient Babylon. Let us now go further north and make our way to Ephesus, 35 miles from Smyrna, in Asia Minor. We shall find it in ruins, but five or six hundred years before Christ it was one of the famous colonies of Greece. There we shall see what remains of the Temple of Diana, which was considered by the ancients to be one of the wonders of their world.

Diana was an ancient goddess whom the Romans thought to be the same as the Greek goddess Artemis. She was the goddess of the moon and light, and was regarded as the patroness of purity. She was sometimes called the Huntress. In artistic representations of Diana, she is shown carrying a bow and a

quiver of arrows, and is accompanied by stags and dogs. She wears a long robe and veil, and her brow is adorned with the crescent of the moon. The people of Ephesus erected a wonderful temple in her honour. Its walls bore magnificent carvings, and inside the temple the altar of sacrifice was designed by the famous Praxiteles himself. Now all this grandeur has been razed to the ground.

THE DISCUS THROWER

We can easily understand the importance of Ephesus when we wander round the other ruins which stand close to Diana's Temple. We can admire the Stadium or sports arena where the ancients used to indulge in wrestling, throwing the discus, and other games of skill, and the fine theatre where they sat and enjoyed the wonderful Greek dramas.

We have not far to go before we reach our next point of interest. Twelve miles off the coast of Smyrna is the small island of Rhodes. It has an area of about one thousand square miles and is very mountainous. The capital city is Rhodes. In the time of Alexander the Great its walls were nine miles in circumference, and it was thought to be one of the finest cities in the world. At the entrance to the harbour

of Rhodes stood the famous Colossus, another of the Seven Wonders of the Ancient World. The word "colossus" was originally Greek but was later adopted by the Romans. It was used to describe huge statues, and was specially applied to the statues at Rhodes which represented the god Apollo.

It was made of brass, was over 100 feet high, and took twelve years to build. It stood with one leg on either side of the harbour, and ships sailed beneath it as they entered the port. About the year 200 B.C. an earthquake shook the statue, and it fell to the ground and remained there until A.D. 672. It is said that the statue was then sold to a merchant, who divided it into many pieces which he loaded on 900 camels! We can, in this case, truly say, "How are the mighty fallen!" Do you know whose words we are quoting here? They were uttered by King David lamenting for the death of Jonathan.

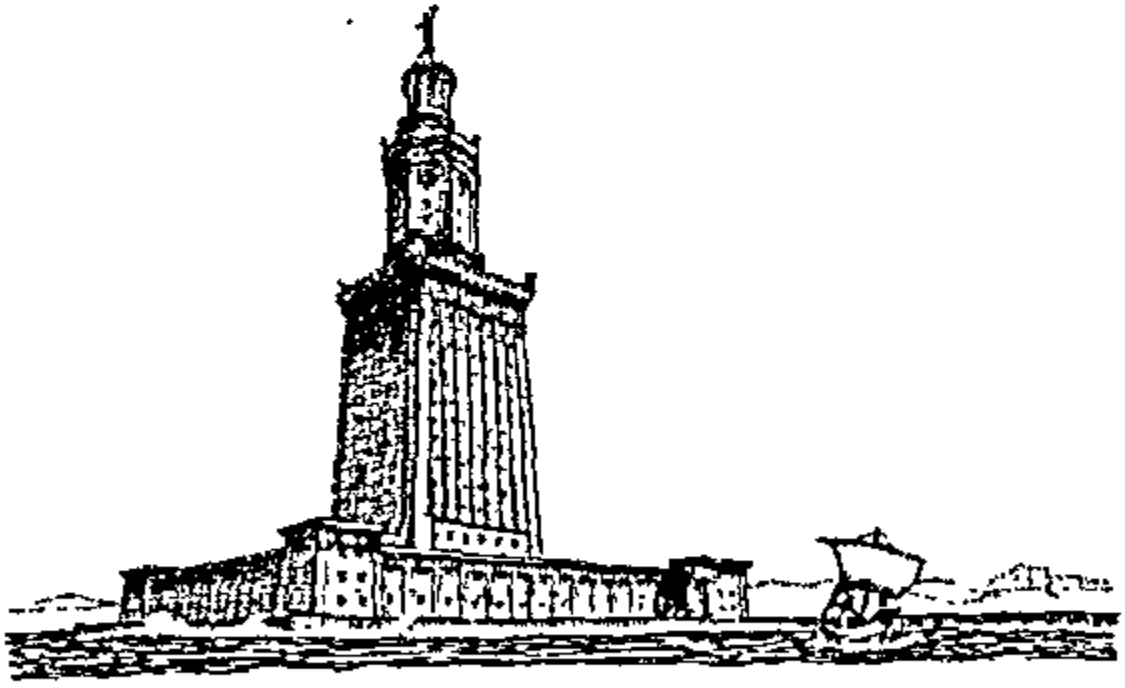
Our journey now takes us from Smyrna across the Aegean Sea to Greece. Here in ancient times there was a place called Olympia, where the great festival of the Olympic Games was celebrated every fourth year. It was a small plain, with a temple and a sacred grove dedicated to Zeus, the chief of all the Greek gods, whom the Romans called Jupiter. The present-day ruins are so very impressive that we can easily imagine what Olympia must have been like when the worship of Zeus was flourishing.

The father of Zeus or Jupiter was Saturn. Saturn was in the habit of swallowing all his male children, and Jupiter would have been no exception had not his mother, Rhea, saved him from this fate. Jupiter, whose wife was Juno, was thought to be the greatest of all the gods who dwelt on Mount Olympus. He had power over tempests, rain, thunder, and lightning, and hurled his thunderbolts on those who incurred his anger. The Greeks erected at Olympia a colossal statue to Jupiter under his title of Zeus. It was the work of Phidias, the greatest sculptor of ancient Greece, and represented a seated figure over sixty feet high Ivory was used to represent the god's body, and his mantle was wrought of beaten gold Gold, ebony and ivory went towards the making of the throne on which he was seated In his right hand he held a figure of Victory, and in his left hand a staff surmounted by the figure of an eagle. Truly an impressive sight!

Have you ever heard of the long word, Halicarnassus? I wonder how many of you have. It was the capital of a mountainous country called Caria, in Asia Minor, near the Aegean Sea. In 353 B.C. on the death of King Mausolus, his wife, Artemisia, erected a splendid tomb or mausoleum, so marvellous a work that the ancients numbered it amongst their "Seven Wonders." The remains of this mausoleum are to be found in the British Museum, where a re-

construction of it, on a small scale, gives the student an idea of its dimensions. If you could see the reconstructed tomb in the British Museum you would admire the beautiful group of carved figures which crowns its summit. It is a quadriga, or group of four horses, in which ride the King of Caria and his queen Artemisia. If you refer to your dictionary you will find that the word "mausoleum" means a magnificent tomb or monument to the dead, and now you will know the reason why it is used.

We finish our study by going back to where we started—Egypt. On its coast which overlooks the



THE LIGHTHOUSE OF ALEXANDRIA (RECONSTRUCTED)

Mediterranean Sea, the port of Alexandria has been situated since very remote times. It was founded in 332 B.C. by Alexander the Great, and for over one thousand years was the capital of Egypt. Placed as it

was between the East and the West it soon became the "metropolis of commerce". King Ptolemy II reigned from 309 to 246 B.C., and during his reign he built the Pharos or lighthouse on an island in the bay of Alexandria. Ptolemy was not a great fighter like his father, but delighted in a life of luxury and kept a splendid court. In spite of this, however, he loved to spend most of his time in his library, and fostered all the fine arts. His lighthouse was built of white marble and rose to a height of nearly five hundred feet. On the top there burnt, day and night, a huge fire of wood which could be seen even thirty miles out at sea. This wonderful building was still standing in the twelfth century. The inroads of the sea and earthquakes gradually ruined this Wonder of the Ancient World. To-day a modern lighthouse stands near the site of the ancient edifice, and is a safe guide to all ships approaching the port of Alexandria.

I trust you have read about the "Seven Wonders" with interest, and will be able to answer the few questions which follow.

QUESTIONS

1. What impressions do you get on reading about the Seven Wonders of the Ancient World ?
2. What special characteristics would you say the ancients had ? Give your reasons.
3. Can you suggest why no Indian "wonder" is included in the list ?

NOTES

Pliny : a famous Roman writer on natural history (A.D. 23-79). He died during an eruption of Vesuvius.

Hercules : one of the ancient Greek heroes, whose name still signifies enormous strength and valour.

quintuplets : five children born at one time. The most famous case in recent times was the birth of the Dionne quintuplets in Canada.

conjures up : makes something appear to exist as if by magic.

encroach upon : trespass upon.

Herodotus : (484-425 B.C.) a Greek historian, sometimes called the " Father of History."

Khufu or Cheops : was King of Memphis and built the Great Pyramid in readiness for his own burial.

hieroglyphics : pictorial symbols carved or painted on ancient Egyptian temples, monuments, etc.

sarcophagus : a stone receptacle for a dead body.

basalt : a mineral in which there is a lot of iron. It was used largely by the ancient Egyptians and Romans for building purposes.

alabaster : a hard marble-like stone. The ancients named it so because it was first found at a place called Alabastron in Egypt.

diadem : a symbol of royalty, a crown.

censer : a metal receptacle in which incense is burned. Some censers are fixed to chains by which they are swung so that the breeze caused by the swinging keeps the fire alight.

incense : fragrant spices which give a very pleasant perfume when burnt. (See note on censer.)

Babylon : the ancient capital of Babylonia from 2250 B.C.

Nebuchadnezzar : (604-561 B.C.) king of the Babylonian Empire. He reigned for 43 years.

Media : a country which is now the north-western part of Iran (Persia). The Median language, religion, customs, etc., were allied to those of the Persians.

impregnable : capable of resisting all attacks.

patroness : a female who protects or favours others.

Praxiteles : (364-330 B.C.) one of the greatest Greek sculptors.

discus : *a flat circular plate of metal hurled through the air as* a test of strength and skill.

thunderbolt : a vivid flash of lightning followed immediately by a very loud clap of thunder.

Mount Olympus : situated in Greece ; over 9,700 feet high. The Greeks regarded Mount Olympus as the abode of the gods.

British Museum : originated in 1753. Situated in Bloomsbury, London. It has a library of nearly 4,000,000 volumes, and contains priceless collections of great historical importance.

the fine arts : sculpture, painting, architecture, poetry, music and the drama.

edifice : a large stately building.

ELECTRICITY

The wonders performed by electricity are so many that it would take a much larger book than this to describe them all. In the last few years electricity has been used more and more throughout India. Electricity makes our trams run smoothly along the road ; it whirls the punkahs over our heads whilst we sit in school, if our school is lucky enough to have electric punkahs ; it furnishes light by which we can read our textbooks at night when we are doing our home studies ; it helps to make ice which refreshes us during the intense heat ; it lights the street at night and makes our cities safer than they would be otherwise ; it drives printing presses and enables us to get up-to-date news everyday ; it makes the films move and thus gives us much pleasure when we go to the cinema. What would life be like without the blessings of electricity ?

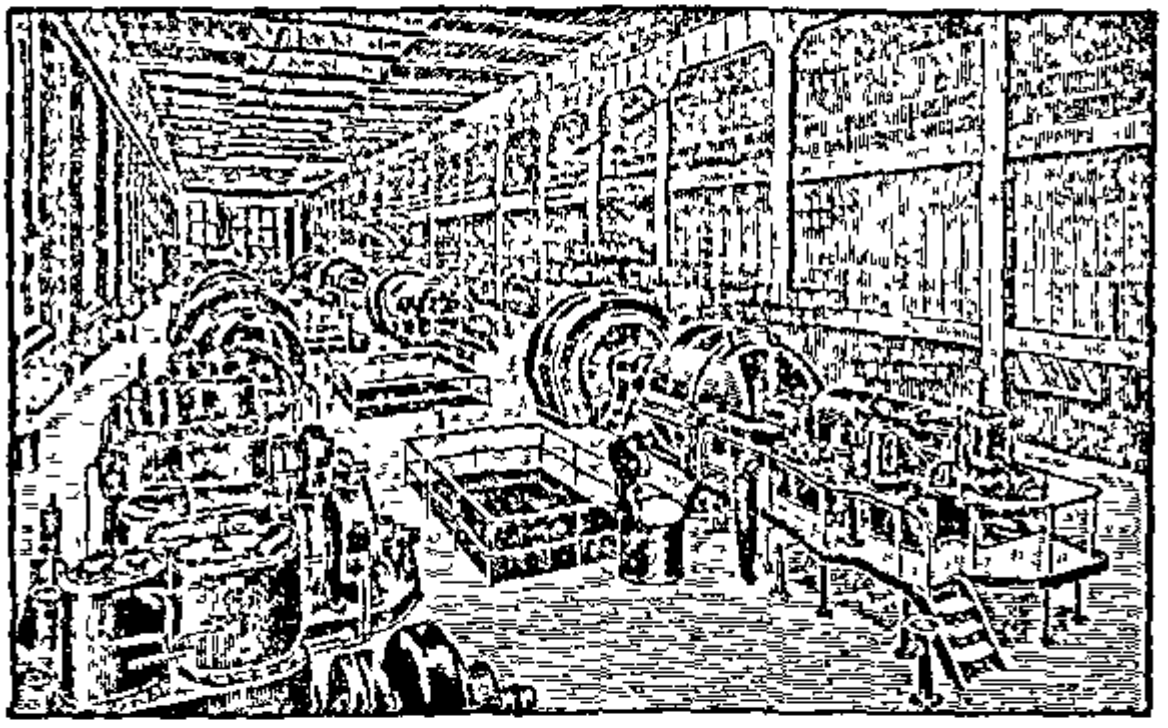
Now, what is electricity ? In very ancient times the Greeks noticed that if pieces of amber were rubbed together, they showed peculiar properties. They attracted to themselves various small objects. They also gave forth tiny sparks when put next to a piece of metal. The Greek name for amber is *electron.*

For many centuries the behaviour of amber greatly puzzled and amused people, but man's knowledge of electricity did not develop. It was not until the

eighteenth century that Benjamin Franklin became engrossed in the study of the subject. Franklin made a long series of experiments, and succeeded in getting electricity from the clouds with a kite. He suggested the lightning conductor, which is a metal rod attached to tall buildings ; it protrudes above the roof and runs down the side of the building, and its end is buried in the earth. During a storm, the large electric currents, which may pass as lightning flashes between a cloud and the earth, travel more easily through the lightning conductor than through a house which might be destroyed by them.

Some time later, Signor Luigi Galvani, who was experimenting in his laboratory with dead frogs, noticed that when he touched the nerve of one of the legs of a frog with a metal knife the leg jerked as though it were alive. Galvani suspected this to be due to an electric current. Professor Volta, of Pavia University in Italy, proved that electricity could be produced by contact between two metals, such as the iron of the knife used on the frog and the brass of the metal plate on which the dead frog had been placed, the leg nerve acting as a conductor. Eventually, after more experiments, Volta found that zinc and copper were the best combination of metals for the purpose of producing electricity. He prepared a number of plates of zinc and copper and cardboard. The cardboard was soaked in a solution of salt. Then Volta

placed a piece of copper at the bottom, and on it a piece of zinc and then a piece of cardboard. Several such layers were placed one above the other. By connecting the copper plate at the bottom with a zinc plate at the top of the pile with two pieces of wire he obtained a spark of electricity. This proved the truth of his theory, and the experiment laid the foundations for our present-day electric battery.



AN ELECTRIC POWER STATION

From this time ideas about electricity advanced very rapidly. An outstanding experimenter was Michael Faraday, who was born in England in 1791. He was the son of a blacksmith, and was sent to work first at a bookbinder's shop. He read many of the books sent in to be bound, and after attending

some lectures by a famous scientist, Sir Humphry Davy, at the Royal Institution in London, he became an assistant there. Eventually he rose to be head of the Royal Institution, where he lived nearly all his life. He made many discoveries in chemistry and physics, but he is most famous for experiments proving that an electric current in one wire can produce another electric current in a different wire not connected in any way with the first wire; this is known as the "induction" of an electric current. This great discovery, made in 1831, is the basis of all the machines known as dynamos which generate the electric current lighting our houses, driving trams, and working hundreds of machines we see in daily use. It is also the basis of the electric motor, and the telegraph and telephone. Faraday also discovered how electricity is conducted through melted salts and through solutions of salts, work which made possible electroplating and similar processes. The whole of the modern electrical industry depends on the discoveries made by Faraday.

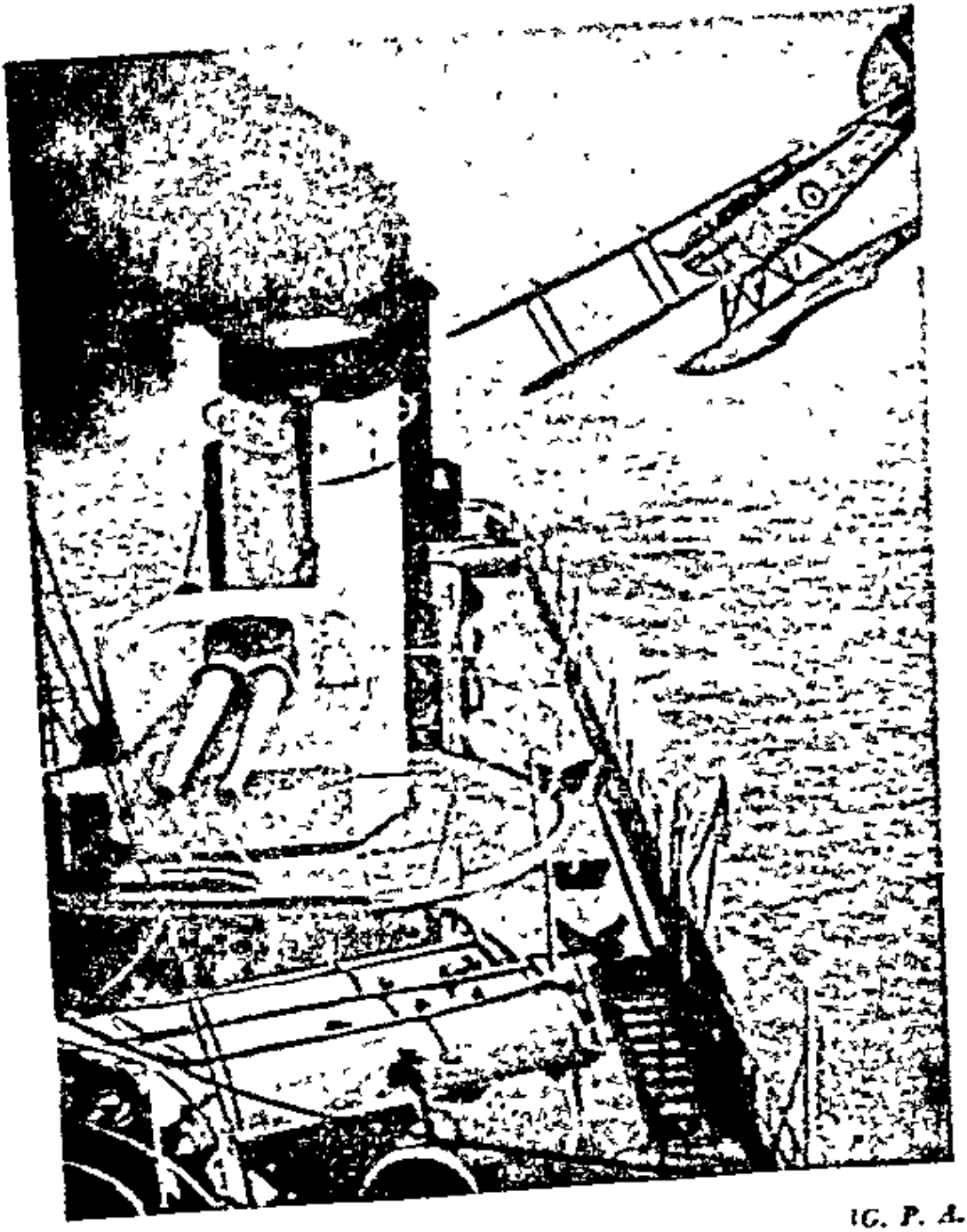
The subject of electricity is so technical, however, that I think it best that you should postpone a detailed study of this engrossing subject until you become a student at the University. There you will find learned professors eager to teach you all they know about this wonderful power. We can, however, study, some of the benefits which electricity has conferred on mankind.

Electricity is generated in huge power stations. Many of the principal cities of India have such stations. It is from these power stations that the current is distributed to our houses, factories, shops and streets.

Most of you are familiar with the telephone. We can speak to our friends living in the same town, or a thousand miles away, or even in South Africa, Australia, America, or England. Without electricity this could not be done.

Then we have broadcasting, which uses a kind of wireless telephone, by which we can transmit a message or music to a great many listeners at one and the same time. Apart from the great educative and entertainment value of wireless broadcasts, the wireless has been a means of saving the lives of many people at sea. Warnings of cyclones and tornadoes can be given in plenty of time to the places which are about to be visited by such upheavals of Nature. Even the life of a sailor on a small vessel at sea has been saved by an officer following the wireless instructions of a doctor on a liner many hundreds of miles away.

The wireless and broadcasting side of electricity is being developed more and more every day, and there is no knowing what future wonders wireless will make possible. To give you an instance, a large battleship puts to sea. There is not a man on board, yet it is possible for people in a seaplane, hovering near, to

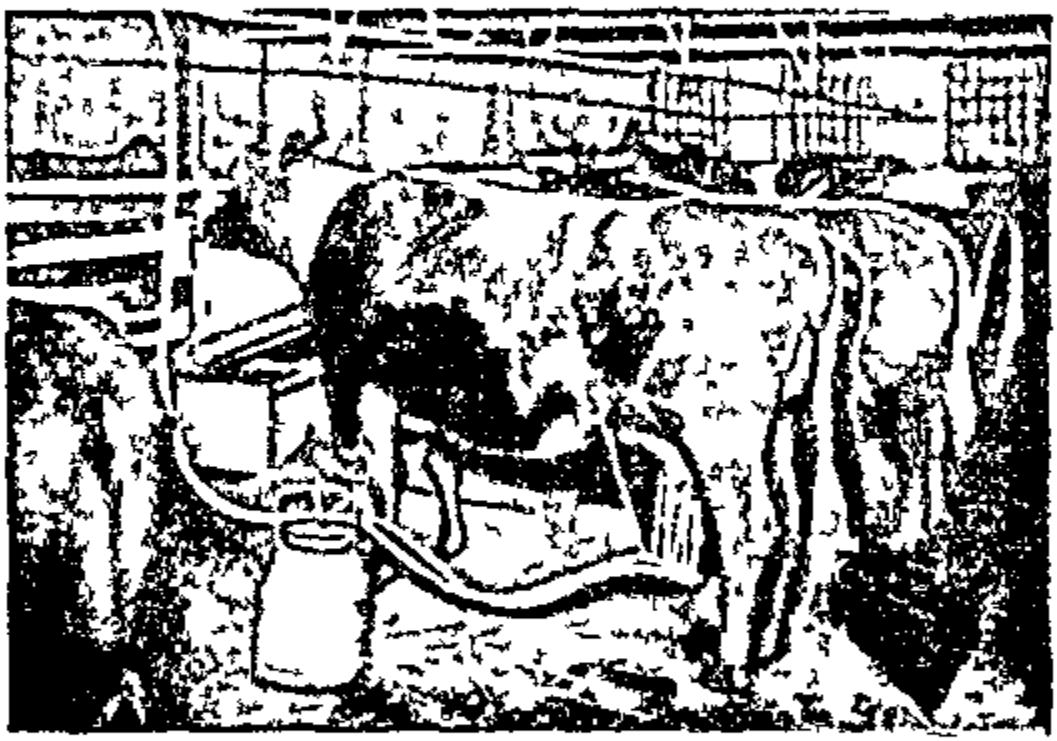


G. P. A.

A SEAPLANE DIRECTING AND FIRING THE GUNS ON BOARD A RADIO-CONTROLLED AND CREWLESS WARSHIP

direct the vessel and fire the guns on board by means of wireless control You will find a separate chapter dealing with wireless and its wonders

There is an automatic machine, electric of course, which cuts twenty-nine thousand slices of bread in an hour. There are electric stoves which will cook our meals without the slightest worry There are also electric restaurants in which the food is cooked by



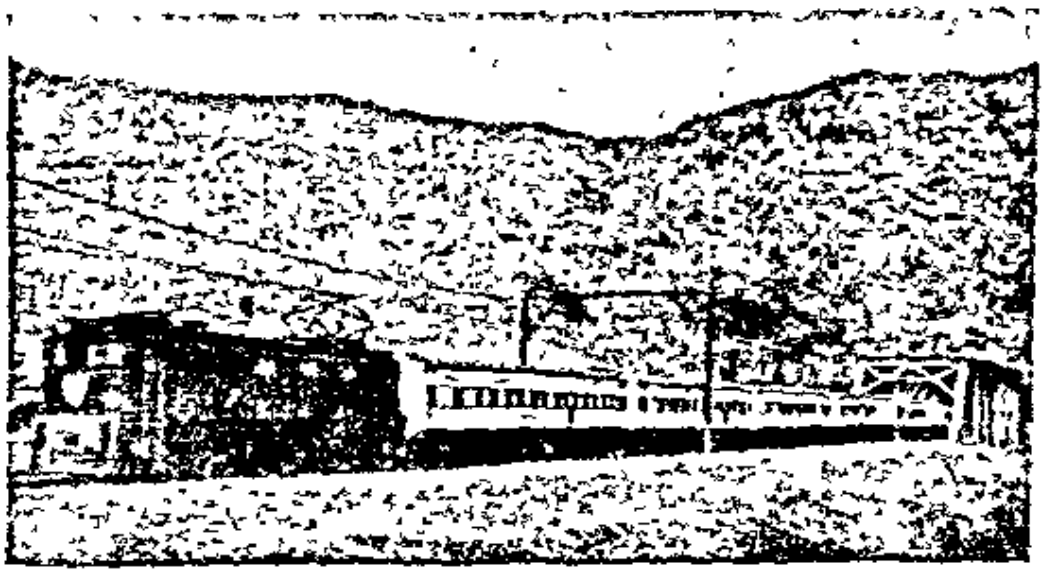
[The General Electric Co Ltd England

A MILKING MACHINE

electricity It is then placed in cases, duly labelled, on one side of a long room The customer comes and chooses the food he requires, and when the price is placed in a slot at the side, the window of the case automatically opens and the customer takes away his

food to the other side of the room, where tables and chairs are arranged for his use. When he has finished his meal the dirty dishes are placed on a moving band worked by electricity, and are carried away. On they go to the electric washing machine, which very wonderfully sorts out the dishes, cleanses them thoroughly in hygienic conditions, and dries them.

Even the field of agriculture has been invaded by electricity. Cows are milked by electricity and there are electric ploughs for ploughing the fields. The farmers' perishable produce, such as milk, eggs, butter, etc., can be preserved in the wonderful refrigerators which are so popular in many households nowadays. The medical world also pays homage to electricity. Where would our doctors and scientists

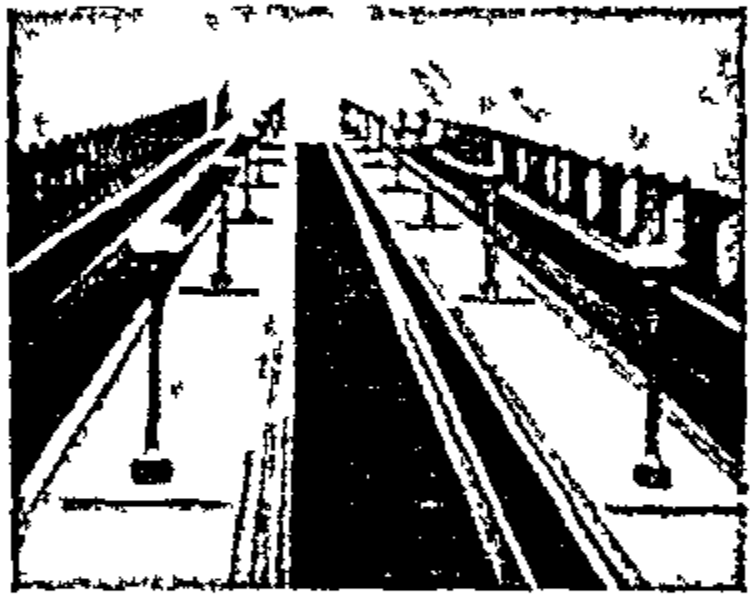


ELECTRIFIED RAILWAY TRAIN NEAR BOMBAY

be without the wonderful X rays, which allow photographs to be taken of the interior of the human body, *and thus enable doctors to see what is wrong*

There are electric irons for ironing our clothes electric toasters for toasting bread, and electric fires *for warming our rooms during a cold spell*

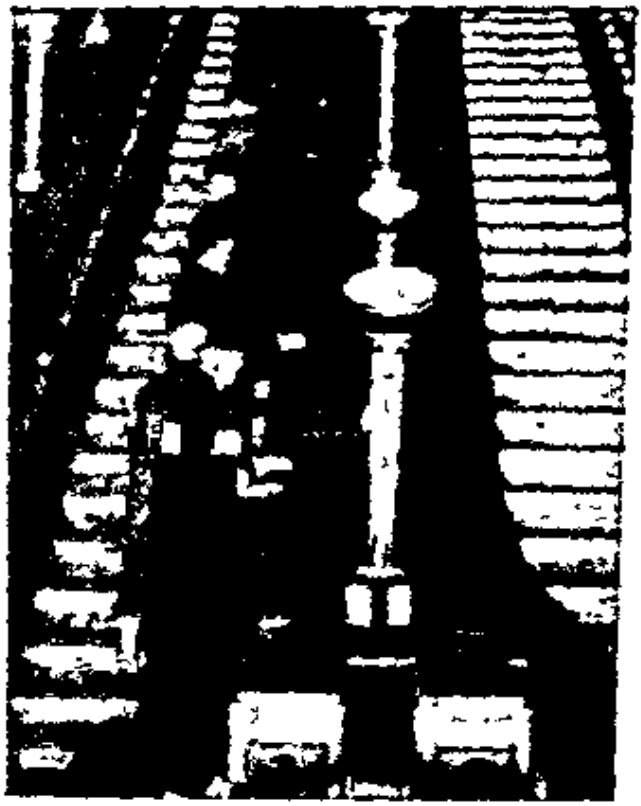
There are about ten thousand miles of electrified railroads in the world, and even some in India where



AN ESCALATOR OR MOVING STAIRCASE

electric possibilities have not been fully developed London has a very wonderful electric underground railway called The Tube The passengers go down to the trains in lifts An attendants starts the lift by pressing an electric button and it descends and stops when it reaches the buttom of the life shaft There it discharges its passengers It cannot start

again until the gates have been closed. In many large stations there are escalators, which are moving staircases. They are endless belts of steps. One pair of escalators can do the work of five lifts. To the new comer it is a very thrilling moment when he



PASSENGERS ON AN ESCALATOR

attempts the upward or downward journey for the first time. The stair moves so swiftly that it is truly a case of "he who hesitates is lost." It is not really so bad as that, but one is apt to lose one's balance if one does not step off from the ground on to the moving stair with the correct foot. When you go to

London, you will be able to experiment on the moving staircase and acquire practice and skill

AN UNDERGROUND RAILWAY STATION

QUESTIONS

1 Make a list of the electrical wonders described in the chapter and arrange them in order of usefulness

2 Some students are born electricians and know more about the subject than many of their elders Write an essay on electricity so that your teacher may judge what you know about this wonderful power

3 What is amber ?

NOTES

whirls makes circular motion
protrudes : rises above the level of
engrossing *engaging all our attention*

conductor : a material through which an electric current can pass.

cyclones : very fierce storms with high winds.

tornadoes : very violent storms accompanied by black funnel-shaped clouds and a whirlwind.

hovering : hanging motionless in the air.

automatic : *self-acting.*

botheration : annoyance ; trouble.

slot : a narrow opening for inserting money.

refrigerators : steel cupboards or rooms in which perishable foods are kept cool and fresh.

THE WONDERS OF THE OCEAN

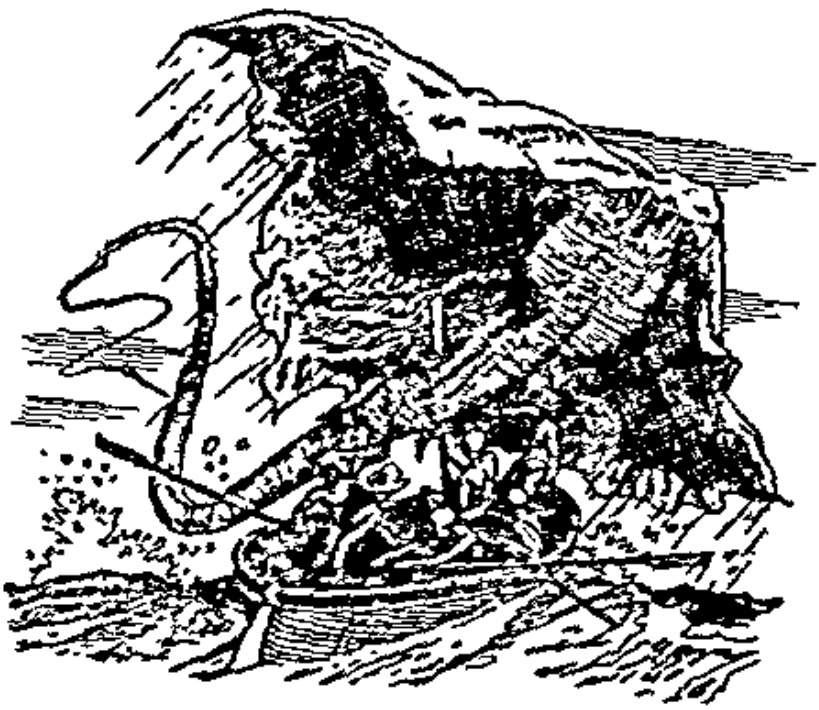
About one-third of the world consists of land, and two-thirds of ocean It is rather difficult to describe the ocean because so many of you have never seen it Hence it may take some time for you to grasp what exactly it is All of you, however, have seen a river Try to imagine a river so large and wide that it is impossible for you to see the other side of it The ocean is something like that

The ocean is a vast expanse of salt water which in some parts covers thousands and thousands of miles between different lands The place where the ocean touches the land is called the seashore Some shores consists of sand, others of small stones called pebbles, others are merely large pieces of rock piled one upon another by the fury of the ocean , others are steep cliffs where the land meets the sea Although the ocean may generally look as calm and peaceful as one of our household pets, still it can rage with all the fury of a roaring lion in search of victims to devour

The writer has often sat on the seashore for hours at a time, gazing at the distant horizon and the shimmering blue sea The more one watches the sea the more one realizes its power, and how helpless the land is in comparison The mighty sea could so easily wash away great stretches of firm land, and cause

The ocean also offers adventurous men a rich reward in the shape of treasure, which in some instances has been lying in the wrecks of ships *for hundreds of years past, as also in ships which have* been sent to the bottom of the sea by the hatred of man during more recent years.

Spread over the ocean bed are banks of gorgeous coloured plants of various shapes and sizes. The



A GIANT RAY ATTACKING SEAMEN

ocean provides the necessary food for all its denizens. It keeps a large army ready to defend its mysteries. The sword-fish, the giant ray, the electric eel, the clam, the giant squid, and many other deep-sea monsters,

combine to attack anyone who invades Father Neptune's dominions

In tropical countries butterflies are famous for their gorgeous colouring However, in the seas surrounding tropical countries the fish outdo in colour even the tropical butterflies The Paradise Fish is of brilliant gold, banded with red The Angel Fish has long fins which extend beyond its tail Some of these fishes are sky-blue and gold, or orange red or merely black and gold or orange striped with brilliant blue markings The Hog Fish of the West Indies is a brilliant crimson , the Spanish Lady is a bright crimson richly streaked with gold , whilst other fish in the Pacific Islands are all shades of green, with the most glorious blue, soft rose, red, crimson, purple and gold mingled in confusing profusion, and delicately tinted, just like a Spanish shawl One could go on describing these fishes for hours, and still the catalogue of gorgeous colours would be incomplete If you ever visit Madras, do not fail to visit the Aquarium on the Marina where many specimens of brightly coloured and delicately hued fishes are housed in the surroundings to which they are used You can then study at first hand some of the wonders of the ocean You will be amazed at their variety and colours

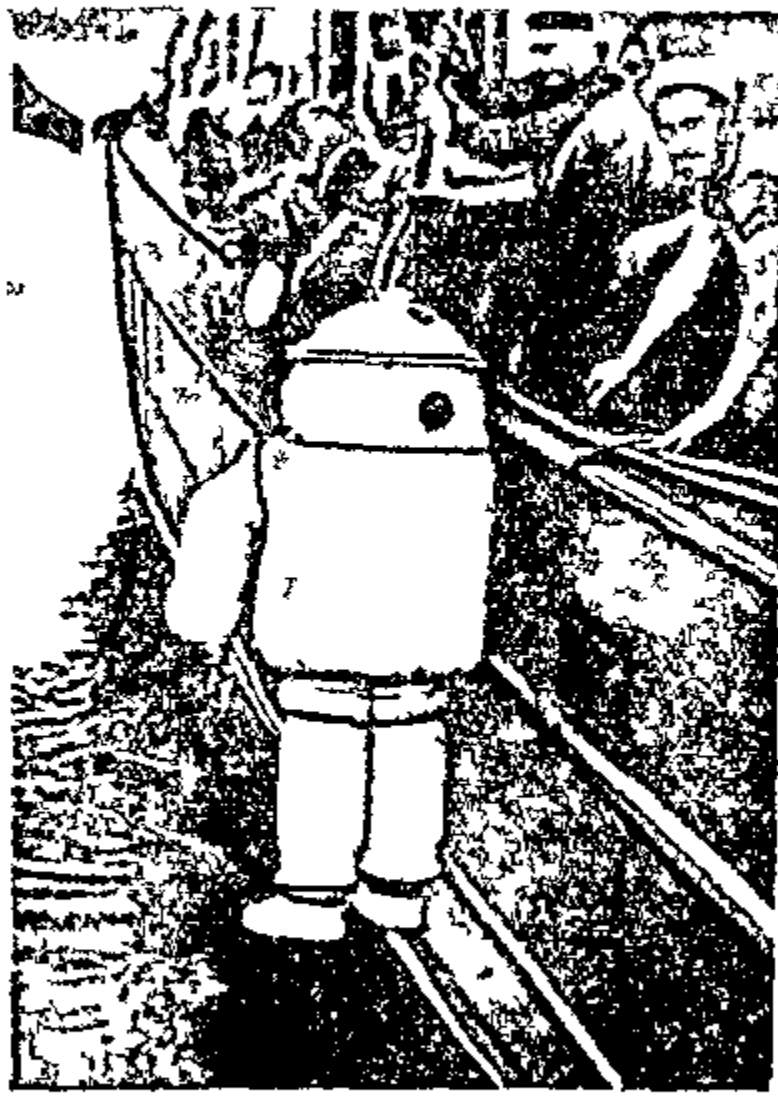
THE SEA HORSE

Look especially for the sea-horse, a fascinating little creature.

The work of the modern diver has been greatly simplified since the Great War of 1914-18. So many ships were then sent to the bottom of the ocean, some containing much treasure, that engineers sought out means of making the diver's work more efficient. It is now possible to use an acetylene torch at the bottom of the sea just as freely as if it were being used on land. The diver can cut through the steel plates of the sunken vessels and effect an entrance into their strong-rooms. He can see what he is doing by the light of a powerful submarine searchlight which turns the ocean darkness into daylight.

One of the most remarkable recoveries of lost treasure from the sea was the case of the s.s. " Egypt ". The " Egypt " was a P. & O. liner which was sunk off the coast of France by a French steamer in 1922. She sank in over seventy fathoms of water. The " Egypt " was on her way to India, and carried over one million pounds worth of gold and silver ingots. Engineers at once began to devise diving-suits which could resist the very great pressure which would be encountered

waters with a heavy steel cable suspended between the two ships, hoping that if they encountered a wreck the steel cable would quickly show them the exact position After many days of tiresome sailing they located a wreck A diver in one of the new armour



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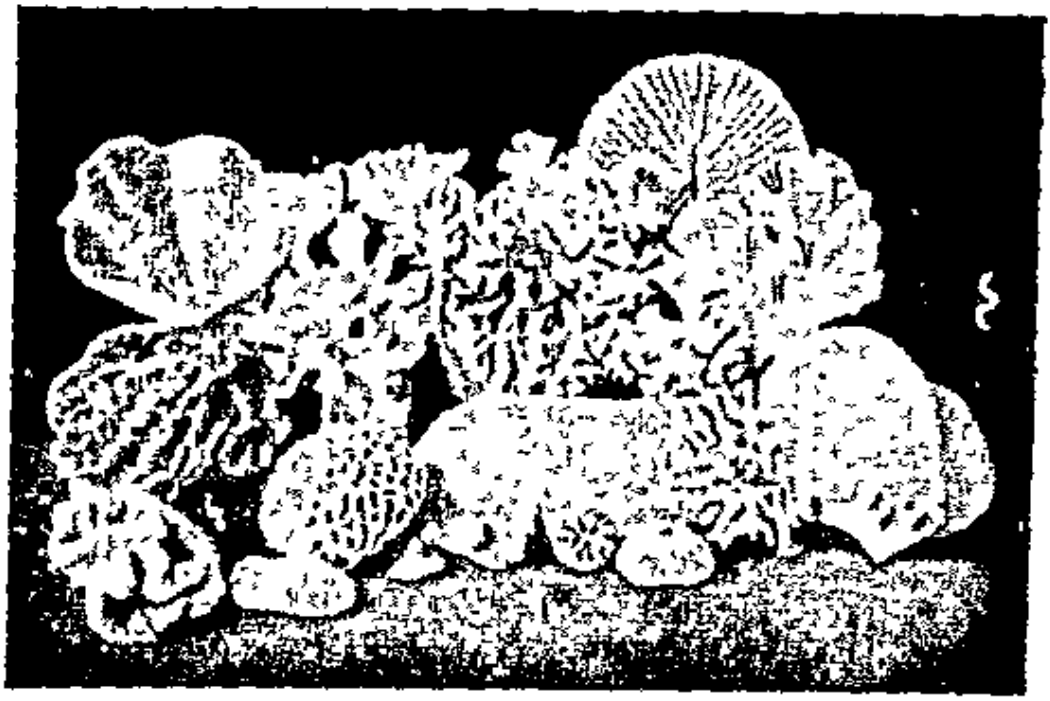
A DEEP-SEA DIVER

ed diving suits called an Iron Man , was sent down, and he found that the wreck was indeed the "Egypt' The captain s cabin was soon discovered

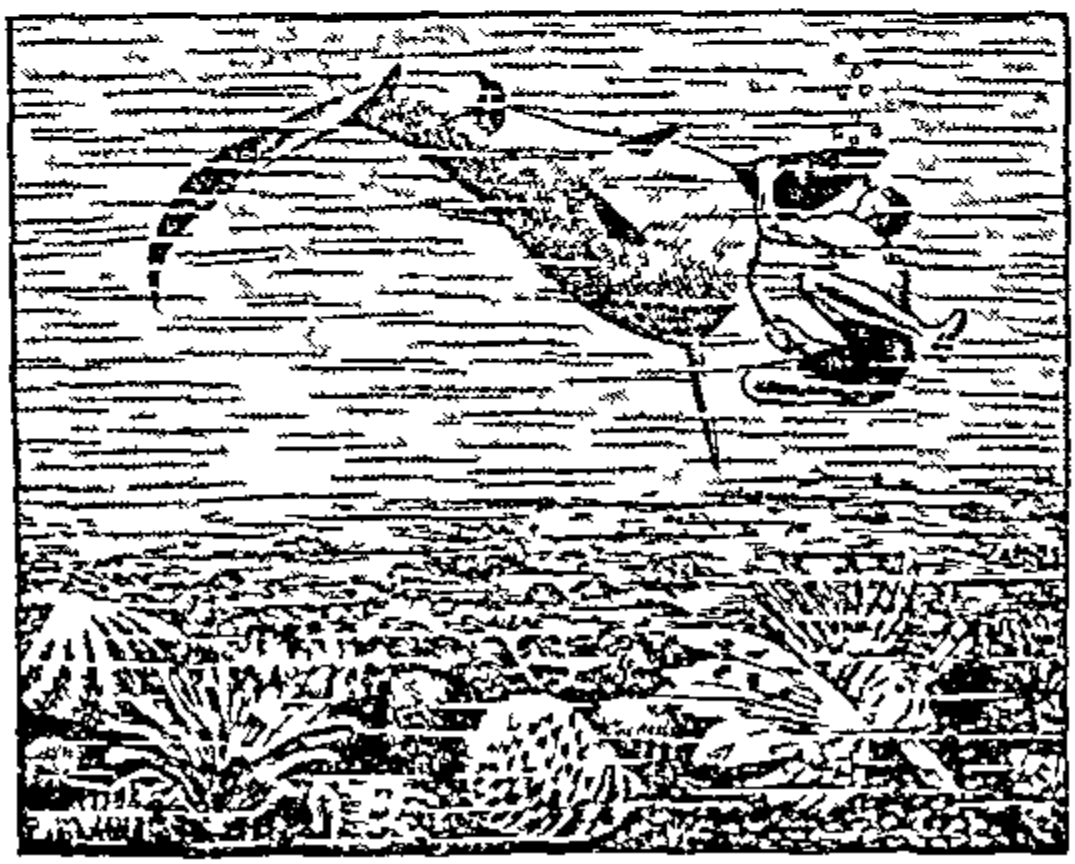


A GROUP OF CORALS

and his safe was rescued, but the treasure was not there. It was stored in the bullion room which was situated three decks below the captain's room. When the weather grew too boisterous the work had to be abandoned. When it was resumed a hole was blown through the vessel until at last the bullion room was reached. After a further spell of rough weather the Italians were able to get to work again, and this time they were able to introduce grappling-hooks into the bullion room, which brought to the surface load after load of gold and silver ingots and coins. This shows you how the pertinacity of a man can overcome the greatest obstacles of the mighty sea.

We will close this chapter with a short story which

is perfectly true Some adventurous photographers were once very anxious to take pictures of a fight between a shark and a man They went to shark-infested seas and entered a diving-bell, having first paid a number of men to plunge into the sea and fight the sharks A diving-bell is a steel chamber which is lowered into the sea It is fitted with windows and is large enough to hold two or three men. The photographers took their cameras with them, and when the diving-bell had been lowered into the depths they were able to get pictures of many curious fishes, sea-anemones, masses of beautiful coral,



A FIGHT BETWEEN A MAN AND A SHARK

and even of villianous-looking sharks. The surrounding waters were illuminated by electric lamps which were lowered into the water with the diving-bell.

After they had waited some days the hoped-for fight between a man and a shark did not materialise, perhaps because those who had been hired for the job became nervous when the appointed time approached. One of the photographers, however, became so impatient that he decided to fight a shark himself. The difficulty, he saw, would be to get the shark within range of the cameras in the diving-bell, so that the picture could be taken. The brave man put on a bathing-dress, and taking a long knife with him, waited till he saw a shark near the diving-bell. Then he dived overboard. The huge monster came at him with its mouth wide open, showing all its fearsome-looking teeth. If the fighter came within range of those teeth it would mean good-bye to this world! But luck was with him. When he had manoeuvred the shark to within a few feet of the window of the diving-bell, he plunged his knife right into its stomach. You can guess how thankful he was for a marvellous escape and for helping to secure a wonderful picture. His colleagues in the diving-bell had photographed every action of the fight!

QUESTIONS

1. Write short accounts of iodine, pearls, sponges, and coral.
2. *Who is Father Neptune? What are his dominions?*
3. Describe in your own words how the valuable cargo lost on the s.s. "Egypt" was recovered.
4. Suppose you were bathing with a party of friends near the mouth of the Hooghly River, and were attacked by a shark. Give a short account of what you would do to save yourself and your friends.

NOTES

shimmering : shining with a soft light.
antiseptic : substance which counteracts infection in a wound.
a king's ransom : an immense sum of money.
marine : belonging to the sea.
denizens : occupants, dwellers.
interloper . one who intrudes or meddles.
Father Neptune : the Roman god of the sea, always shown *carrying a trident*.
submarine : anything operating below the surface of the sea.
P & O. : Peninsular and Oriental Steam Navigation Co., a well known line of steamships.
liner : a large passenger steamship.
fathom : a measure of length containing 6 feet, used chiefly in measuring the depth of water.
ingot : a mass of metal cast in a mould mostly in the shape of a brick.
salvage : to save a ship or a ship's cargo after being wrecked.
bullion : uncoined gold and silver.
boisterous : stormy.

pertinacity : determination to succeed.

sea-anemones : a beautiful coloured sea-growth having a striking resemblance to a flower.

manoeuvred : *skilfully moved into position.*

colleagues : associates or partners.

Akhenaton, Pharaoh of Egypt, belonged to the eighteenth Dynasty. He was a very religious man, but was rather bigoted in his beliefs. He ordered that no god except Aton, the *unpopular* sun-god, was to be worshipped throughout the land, and all references to the *popular* god Ammon were removed from monuments and temples by order of the king. The ancient capital of Egypt was Thebes, but Akhenaton removed himself to Tel-el-Amarna, which he made his new capital. He died in 1350 B.C. after reigning for seventeen years

Now it is only natural that if anybody interferes with the ancient religion of a country a great deal of unrest is bound to follow. The people could not forget their old god Ammon, and awaited the chance to worship him again On Akhenaton's death, Smenkara reigned for a short time The next king was a young boy named Tutankhamen, who had been married to Ankhsenpaaten, the third daughter of King Akhenaton

AKHENATON

The boy king and his girl queen could do nothing to stop the campaign of hatred against the memory of Akhenaton and the god Aton, so they had to comply with the wishes of the people, and worship Ammon. Thebes once again became the capital city of Egypt. Tutankhamen reigned for nine years. Then one day he was suddenly taken ill and died. Perhaps the

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THE VALLEY OF THE KINGS

The entrance to Tutankhamen's tomb is in the foreground.

priests thought that when he became older he would not be so obedient to their wishes, and therefore might have got rid of him when the chance came. Be that as it may, Tutankhamen was buried in the Valley of the Kings, a place which contained the tombs of many of the ancient Egyptian kings and queens. He thus

passed from the pages of history for about three thousand years.

In 1922, a party of Englishmen, who were keen students of Egyptian history, were digging in the Valley of the Kings, hoping that on the off chance they might discover something which would throw more light on the fascinating history of Ancient Egypt. The leaders of the party were Lord Carnarvon and Mr. Howard Carter. For sixteen years they had been digging in the hope of finding something of outstanding interest, and now suddenly, with the removal of a few spadesful of sand, a flight of steps cut in the rock revealed the way to a tomb. Little did they imagine what lay before them. When twelve steps had been cleared of sand, the top of a doorway was seen. When sixteen steps had been

[*Photo : Howard Carter.*

TUTANKHAMEN

The mask of gold, inlaid with costly stones, which was found in his coffin.

cleared, the whole doorway was exposed to view. It was sealed, but the excavators soon saw that the seals were intact and were those of King Tutankhamen himself.

When the doorway was opened they found a long sloping passage which was full of stones, rocks and rubbish. When all this had been cleared away, another doorway, also sealed, was revealed. The great moment had come. With trembling hands Mr. Carter made an opening in the door. Then he pushed a lighted candle through the opening so as to throw light on what was within. His companions stood breathlessly by, awaiting his report.

Mr. Carter says that at first he could see nothing, but as his eyes grew accustomed to the light, details of the room within became clearer,—strange animals, statues, and gold—everywhere the glint of gold! He was struck dumb with amazement. Lord Carnarvon anxiously asked if he could see anything, and Mr. Carter replied, "Yes, wonderful things!" Boxes and caskets of all shapes and sizes, beds, couches, vases walking sticks, linen baskets, bows and arrows, golden chariots—the most amazing collection the world had ever seen. At one end of the room stood a life-size figure of the dead Pharaoh. The king's head-dresss and robe were of gold, and he had golden bracelets on his arms. Against another wall stood two tall statues which looked as though they were guarding some

hidden treasure. In fact the wonders of Ali Baba's cave were totally eclipsed by this ante-room to the tomb of Tutankhamen. For Lord Carnarvon and Mr. Carter knew that they had not yet reached the tomb itself. The coffin of the Pharaoh must be near at hand. Perhaps it was behind the wall which was guarded by the two statues!

The excavators must have been sorely tempted to proceed with their investigations at once, but prudence forbade such action. It was first necessary to clear the ante-room of all the wonderful things which had been found in it. Very great care was taken. Every article was photographed and catalogued, and then packed for removal to the Museum in Cairo. Most of the articles had to be wrapped in cotton wool for fear that the slightest scratch might damage them. Great precautions had to be taken against robbery. In olden days the grave-robbers had been notorious, and very few tombs had escaped their sacrilegious violence. To find a tomb which had come through the ages practically unmolested was an event of the greatest importance, and now such a one had been discovered. Hence, care was taken that present-day descendants of the old tomb-robbers did not appear on the scene for "their share."

It was not till the middle of February, 1923, that the excavators decided to break the wall between the two statues, which you will remember were standing

work, so it was decided to close the tomb once more. After many tons of stone had been placed

ISIS

in position, Tutankhamen was left to rest in peace for a little while longer.

Two long years elapsed before the excavators could resume their work. How long those years of waiting seemed to Mr. Carter and Lord Carnarvon they alone must have known. The tomb was once more opened, and the two beautiful wooden shrines were taken to

pieces and carefully removed. A third shrine was now revealed. It was covered with gold and was beautifully embossed with figures of the gods. It also had doors which were sealed and bolted. Now at last the excavators thought they had come to the body of Tutankhamen. You can picture to yourself the excitement with which Mr. Carter cut the seals and drew back the bolts. Was it the body at last? He pulled the doors open and looked inside. No! another shrine lay before him! Now what did this fourth shrine contain? The excitement was intense. With eager fingers Mr. Carter opened the doors of the fourth shrine. They revealed a huge yellow stone sarcophagus which took up the entire space of the fourth shrine. The lid of the sarcophagus alone weighed one

(*Photo : Howard Carter*

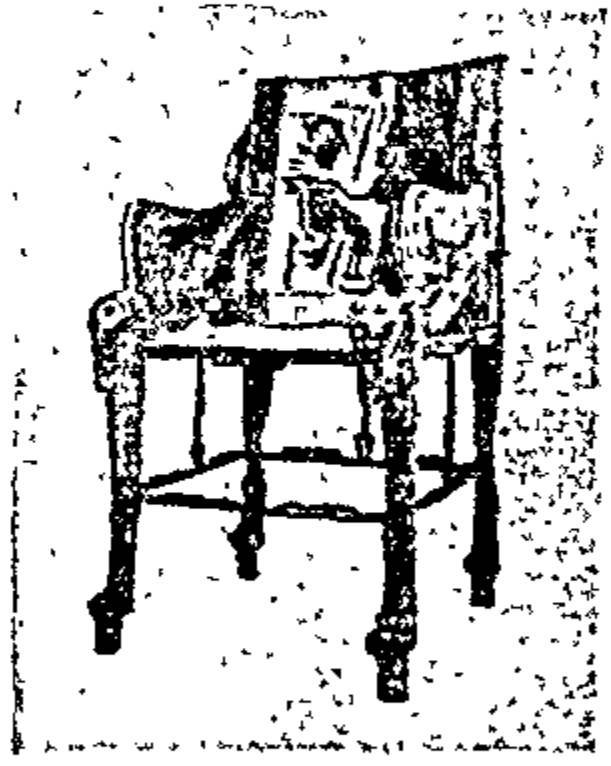
THE GOLDEN COFFIN OF TUTANKHAMEN

and a half tons, so it was a very difficult job to remove it in the small space of the tomb. However, it was removed, and inside the sarcophagus there lay a long figure wrapped in fine linen. The linen was carefully removed, and then the company present gasped with astonishment to see a beautifully finished coffin overlaid with gold, bearing a likeness of the dead king, and decorated with enamels and coloured stones. The head of the young king was most beautifully wrought, and around his brow lay a wreath of flowers, withered, but still retaining slight traces of their colours after 3,000 years. Who could have put this wreath there but the girl queen as a last tribute to her dead husband! The sight of the flowers so affected the excavators that they ceased work for the rest of the day.

The next day the golden coffin was opened. A second coffin was then revealed. All these coffins fitted into each other so perfectly that it was with great difficulty that they were separated. When the second coffin was opened there appeared a long figure wrapped in linen, and when the linen was unwrapped, the chief wonder of the whole excavation was revealed. Still another coffin, but this time of solid gold! It took eight men to lift it, and was valued at £50,000. The most exquisite workmanship had been lavished upon this treasure, and it was covered with lovely enamel work and many pre-

cious stones. When this gorgeous coffin was opened, there reposed the mummy of King Tutankhamen. Just imagine all the love and reverence that had been lavished upon the earthly remains of the boy king!

Another ante-room was discovered beyond the tomb itself, and in it were more lovely things. There was a golden shrine with four goddesses standing at the four corners, but eclipsing this wonder was another wonder—a golden throne. It is carved in wood and overlaid with gold. There is a beautiful panel in the back of the throne, showing the girl-queen arranging Tutankhamen's collar about his neck, whilst her other hand holds a jar of precious ointment—a very human and touching scene.



[Photo . Howard Carter

THE GOLDEN THRONE OF TUTANKHAMEN

So we leave Tutankhamen and all the treasures of his tomb, which are now to be seen in the Museum at Cairo. Although his earthly remains have been

disturbed in the interests of history and science, may his soul rest in peace.

QUESTIONS

1. What is the modern capital of Egypt ?
2. What would you have done, on coming to the throne, *if you had been in Tutankhamen's place ?*
3. Can you suggest where the gold came from which was found in the tomb ?
4. Describe in your own words the opening of the tomb.

NOTES

dynasty : *a line of kings and queens of the same family.*

bigoted : obstinately attached to an opinion, creed or party ; without tolerance.

campaign : a planned series of statements made to secure cer*tain results.*

fascinating : delightful, ; charming.

excavators : those who dig, especially to uncover ancient ruins.

eclipsed : outshone ; was grander than.

Isis : *the Egyptian goddess of fruitfulness ; the wife of Osiris.*

Osiris : the Egyptian god of the lower world and judge of the dead.

embossed : ornamented with raised work or work in relief, *i.e., the designs stand out from the background.*

sarcophagus : a stone coffin.

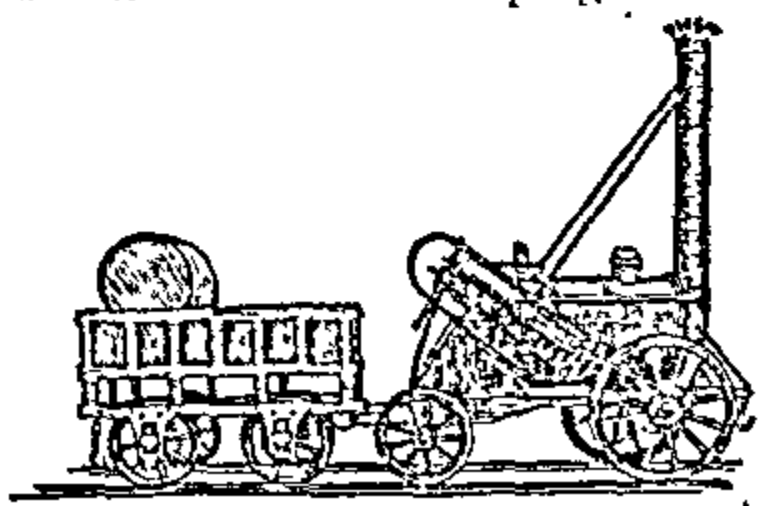
enamel : a substance used in coating surfaces of glass. porcelain or metal. In this case, the enamel was worked on the gold in beautiful designs and in many colours.

THE WONDERS OF TRANSPORT

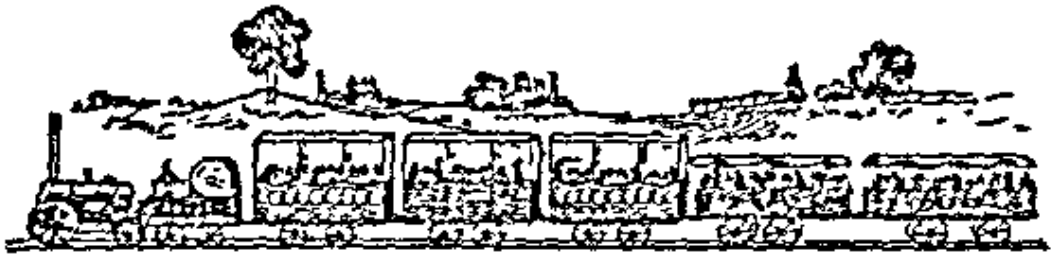
Our early ancestors had to walk if they wanted to go from one place to another. It was quite a long time before the wheel was invented ; some primitive peoples do not know is to this day. Later on, the kings and nobles rode in chariots, or on horseback, or used palanquins carried by bearers. In course of time the bullock cart was invented, and this continued to be the main means of transport in India until about a hundred years ago. The rich people then introduced the carriage and its team of horses. In 1849, three experimental railways were built, and now in India there are over 40,000 miles of railways.

The next stage was the invention of the motor car, and to bring the evolution of transport right up-to-date, we have the aeroplane which can whirl us hundreds of miles through the air in a few hours.

The most notable milestone in the progress of modern transport was the building of George Stephenson's engine, the "Rocket". This steam engine, which could drag a number of



"THE ROCKET"



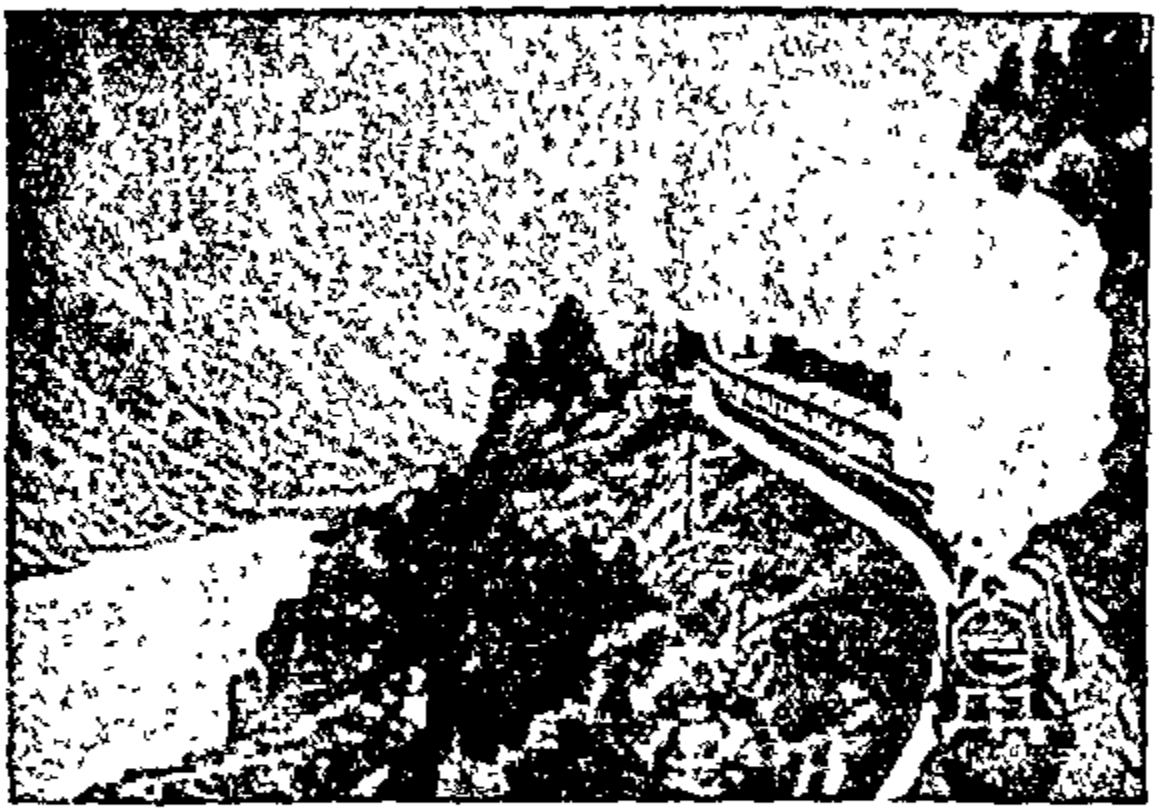
ONE OF THE EARLIEST TRAINS

carriages or trucks along a pair of iron rails, was at first looked upon with awe by the people of England. Only a few adventurous souls experienced the thrill of travelling on something which moved faster than a coach and horses. But as soon as the idea of the steam engine was understood, it was only a matter of time before more powerful engines and more comfortable carriages were used. Nowadays, in England, one thinks nothing of travelling by a train which moves at the rate of sixty miles an hour. In fact the "Cheltenham Flyer," which runs between Cheltenham and London, moves even more rapidly. Some of the West of England expresses take three and a half hours to reach London from the centre of Devonshire without a single stop—a distance of 200 miles. This is made possible by the engine drawing up water, when necessary, from long tanks built into the track between the rails.

Another famous express is the "Flying Scotsman", which runs from London to Edinburgh, a distance of 392 miles, without a stop. In India our fastest trains

are the mail trains between the different provincial capitals and New Delhi.

Then across the Atlantic there are the fast transcontinental expresses from New York to San Francisco and from Halifax to Vancouver and other places. Most of these journeys involve crossing the famous



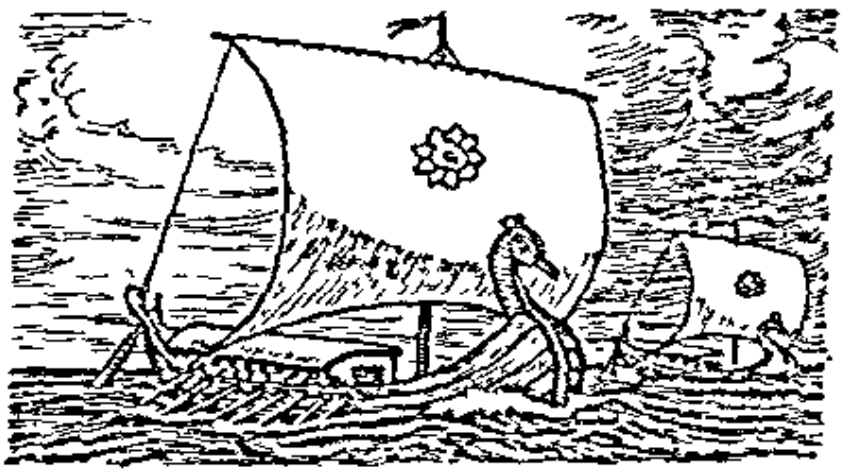
TRAVELLING THROUGH THE CANADIAN ROCKIES

Rocky Mountains. The scenery is magnificent—the lines crossing dark canyons and narrow gorges or hugging the sides of dizzy precipices. These lines convey passengers and goods from the Atlantic seaboard, right across the continent of North America, to the Pacific Coast. Just imagine how long such a

journey would have taken in the old days before the advent of the railroad !

Another early means of transport used by our forefathers was the boat, which was very useful on streams and rivers. No one, however, dared go far out to sea in one of these small craft. Then someone experimented with sails, and larger boats called ships were built.

In Indian history we read of the adventurous people of Tamralipti (Tamluk, Bengal), setting sail



AN ANCIENT INDIAN SAILING BOAT

across the Bay of Bengal and eventually landing in Burma, Java, and other parts of the East Indies. These pioneers settled down in the places they discovered, and thus founded the colonies of Greater India.

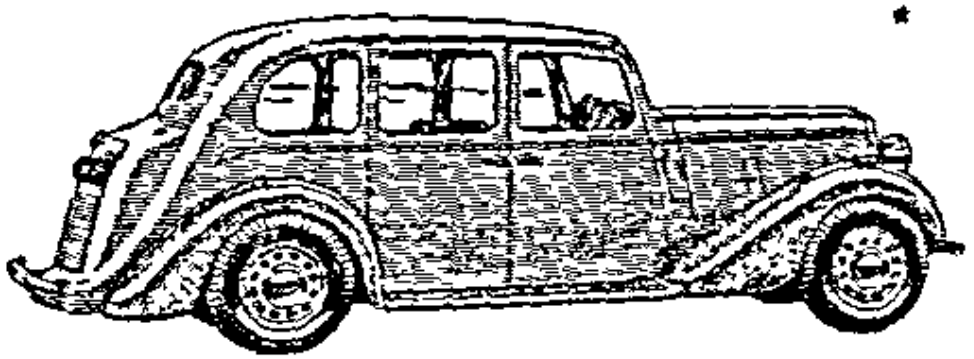
The Arabs were just as adventurous, and they sailed across the Arabian Sea and visited Egypt and

other countries. Some of them continued the journey overland and eventually arrived in Rome with their valuable merchandise. Sailing ships became larger and still larger until, in 1812, James Bell saw the possibilities of propelling ships by steam. The first steamship, the "Comet", set sail from the Clyde, in Scotland, and was a great success.

When the pioneer has proved the worth of his invention there are always plenty of imitators to be found. So it was in the case of the steamship. The "Great Western", 1,320 tons, made the journey between Bristol and New York in fifteen days in 1838. Soon many steamships were crossing the oceans. Their enthusiastic owners could visualise greater things, so in course of time larger steamers were built. Ships of ten thousand tons, then of 15,000 tons, then 25,000 tons, until, in 1936, the majestic "Queen Mary" of 81,000 tons was sailing regularly between Southampton and New York.

The "Queen Mary" is the wonder ship of the age. She is 1,018 feet long and 118 feet broad. Over 500 first-class cabins are fitted with telephones so that the passengers who occupy those cabins can speak from the ship to their friends, even if the ship is in mid-ocean. The "Queen Mary" carries twenty-four steel motor life-boats, each 36 feet long, and [illegible] life-boats can accommodate 3,250 p[illegible] crew should it ever be necessary to take

or noises from powerful engines. Those quiet days are gone, never to return. Hundreds of years ago, Mother Shipton, an old woman living in the English country-side, prophesied "Carriages without horses shall go", and her prophecy has come true. The first motor car looked like a small carriage without the shafts for the horse. The sight of this curious contrivance was greeted with shouts of laughter by the onlookers. What made it even more amusing was that for some time it was the law in England that motor vehicles had to be preceded by a man on foot carrying



A MODERN MOTOR CAR

a red flag! When the driver, who was probably the owner, turned one or two levers and nothing happened, there was renewed laughter. When the engine suddenly started and the motor car moved off with a succession of jerks, the embarrassed occupants were treated to a flood of joking comments. It was still worse when it stopped and the driver had to crawl underneath to see what was wrong.

In 1887 Daimler, a German engineer, built the first two-cylinder petrol engine. Another engineer, named Benz, was also experimenting and it is these two men who can be called the inventors of the petrol engine and the motor car. Once the petrol engine had been devised, it was soon improved and perfected. Nowadays, we have all sorts of motors—private cars, buses, lorries, cycles, racing cars, and mail vans.

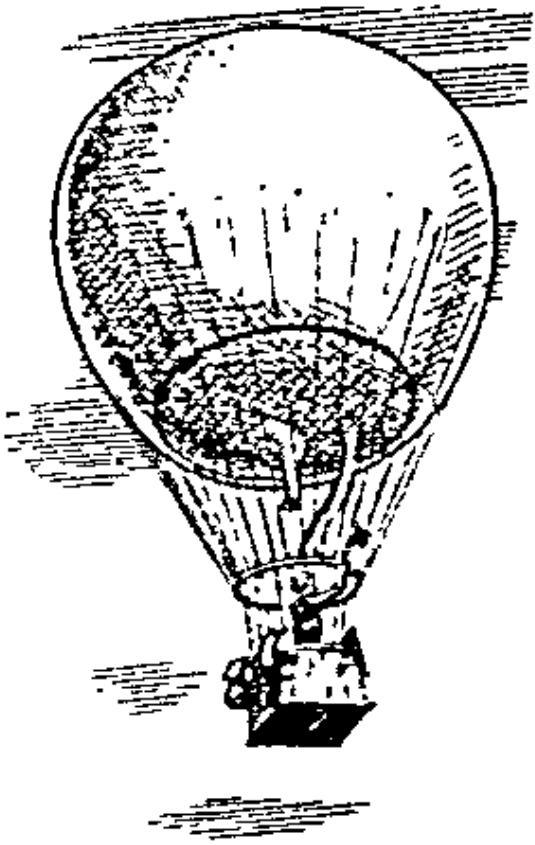
In modern minds the idea of speed and more speed is foremost. Henry Segrave, an Englishman, once held the world's record for speed in his "Golden Arrow". Sir Malcolm Campbell, another racing enthusiast, attained a speed of over 300 miles an hour in his "Blue Bird II".

One of the great advantages of the small family car is that we can take our friends for nice trips within a reasonable distance of our home. We enjoy the sights of the country-side and the pure fresh air, and this fosters to some extent the spirit of adventure. The desire to get out of our usual haunts and surroundings does show an adventurous frame of mind, and once we have tasted the pleasures of motoring for short distances, we shall speedily acquire the taste for adventure further afield.

Travelling by motor car is generally not very expensive. Anything we pay for petrol, oil and upkeep covers the three or four or six passengers we may take with us. If on the other hand we had

to buy railway tickets for so many, think how costly that would be.

Let us now learn something about the aeroplane, the greatest wonder in an age of wonders. For the pioneers of flying, their work was a long series of struggles against the forces of nature. The gas-filled balloon was, of course, one of the forerunners of the aeroplane. But the balloon was not very practicable, as being without engines it was difficult to control. This led to experiments with the balloon and a light engine, and out of those experiments the airship was evolved.



A BALLOON

In 1901, Santos-Dumont flew round the Eiffel Tower in Paris in an airship which carried a 16 horse-power petrol engine. Soon afterwards the German, Count Zeppelin, began to build his airships, some of which successfully crossed the Atlantic a number of times. These airships were inflated with hydrogen, which is very inflammable. As a result of this three horrible disasters occurred, resulting in the loss of three

airships and many lives. Of the three airships involved, one was British, one was German, and the other American. Since those disasters work on airships seems to have ceased.

The first successful aeroplane was built by the Wright Brothers, two Americans, who flew a distance

THE AIR MAIL AT DELHI AERODROME

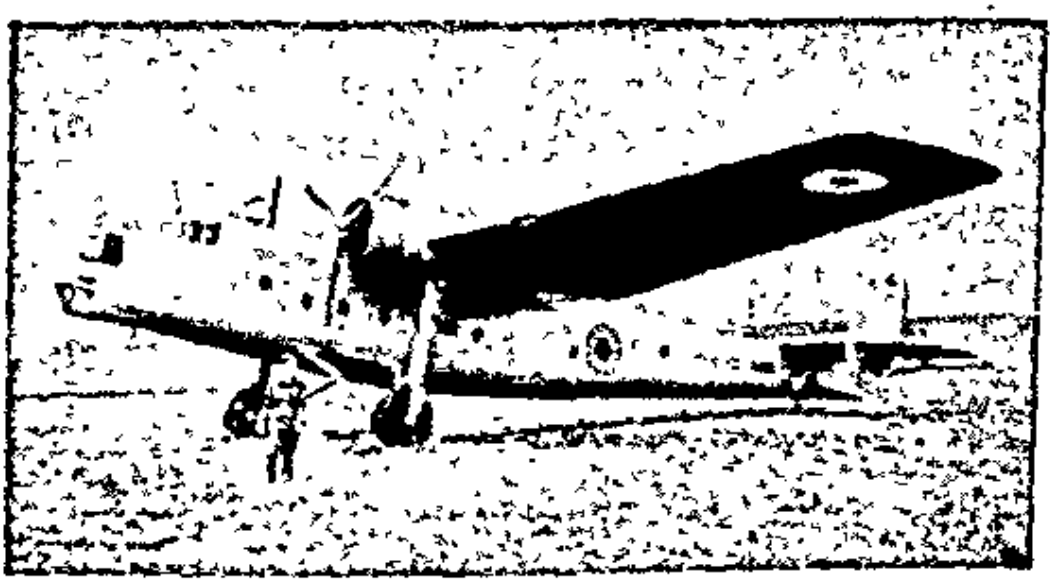
of 24 miles. Since then things have moved with startling rapidity. In 1918 airmen thought nothing of flying a distance of 2,000 miles without a stop. Speed records have now passed the 400 miles per hour mark, and a British aeroplane has actually reached a height of nearly 54,000 feet.

In 1948 the greatest activity in aeroplane manufacture and design was experienced. Many new methods, including jet propulsion, were being tried out. There is a regular service between London, Egypt, India, China and Australia. There is also a

clipper service between America and most parts of the world.

Pandit Nehru, at an important Air Conference in Delhi, on 23rd November, 1948, said :—

"India has made considerable progress in aviation. This was natural, because the country was ideally suited for that purpose. They had wide



A TROOP CARRIER

areas where air travel became almost necessary and essential. The climate too was suitable for the greater part of the year.

"India was curiously situated on the world map. All international routes around the world had almost inevitably to pass over India. Because of this India had influenced all the neighbouring countries and had been influenced by them.

"From sea travel, there had been a shift to air travel in the last generation or so. Great international air liners came across the Western Asian deserts, and went on across India to South-East Asia. They could go from India to China in almost a day. This development of communications had a powerful effect on India as in other countries."

The glorious deeds of the Royal Indian Air Force make epic reading, and we cannot have anything but the greatest admiration for these gallant fighters who battled to save civilisation, whether they were stationed in Britain, Egypt, the Middle East, or India.

Now that we have surveyed the wonders of transport, let us gather together our impressions of what we have read. One impression that remains in the world-wide demand for larger and still larger means of transport, and the desire for speed and still greater speed. Steam, electricity, and the petrol engine have made the vast changes we have seen in the history of transport. What will the next stage be? Will science give us a new source of power, or will there be some wonderful development in those we already know?

QUESTIONS

1. Describe the early means of transport.
2. What great development was brought about by George Stephenson?
3. Describe a journey from Calcutta to Delhi by the Toofan Mail.

4. Give a list of the colonies founded by the adventurous people of Tamralipti.
5. Describe in your own words the "Queen Mary" and her wonders.
6. When you have to make a journey, do you prefer doing so by means of a motor car, a bus, a train, or bicycle? Give your reasons.
7. Give an imaginary account of a journey by aeroplane from Calcutta to Sydney.

NOTES

palanquin : an arrangement for carrying people. It is shaped like an oblong box and is fixed to a long pole which rests on the bearers' shoulders. The Indian term is *palki*.

evolution : development from one stage to another.

truck : a vehicle for carrying heavy goods. The railway truck is made of steel.

Devonshire : a county in the south-west of England, famous for its sailors and explorers.

trans-continental : that which moves across an entire continent.

canyon : a deep gorge with almost perpendicular sides.

hugging : holding close to.

propelling : to move by propellers. A propeller is a screw with broad blades driving a ship or aeroplane.

visualise : to make a mental picture of.

lounges : comfortably furnished sitting-rooms.

Turkish bath : a hot vapour bath which makes one perspire profusely after which the body is cooled down and massaged. Very invigorating.

perpetual : continuous, without ceasing.

prophesied : predicted, foretold.

contrivance : a device or invention.

A WONDER OF THE MIDDLE AGES

A Wonder of the Middle Ages ! I can almost see some of you nudging each other and whispering, "What can this be ?" Well, it is not a striking discovery, or an historical event of importance, or a great advance in science in days when not much was known about the subject. This wonder is neither a famous building, nor a victorious country. It is a man who was able to show the world the amazing versatility of his fertile brain by means of his pen—just his pen ; a man who has entertained millions of people by his plays and by his wit and humour and understanding of human nature.

In your University career you will be asked to give very special and detailed study to the man and his works. Here we can only glance at his career and achievements. The wonder of the Middle Ages is William Shakespeare, whose inspiring, entertaining, and enthralling plays have been translated into practically every known language of the world to-day. Although it is nearly four hundred years since Shakespeare lived in England, observing, studying, writing and acting, no later writer in any country has surpassed or even equalled him in poetic and dramatic genius.

William Shakespeare was born at Stratford-on-Avon, in Warwickshire, England, on April 23rd, 1564.

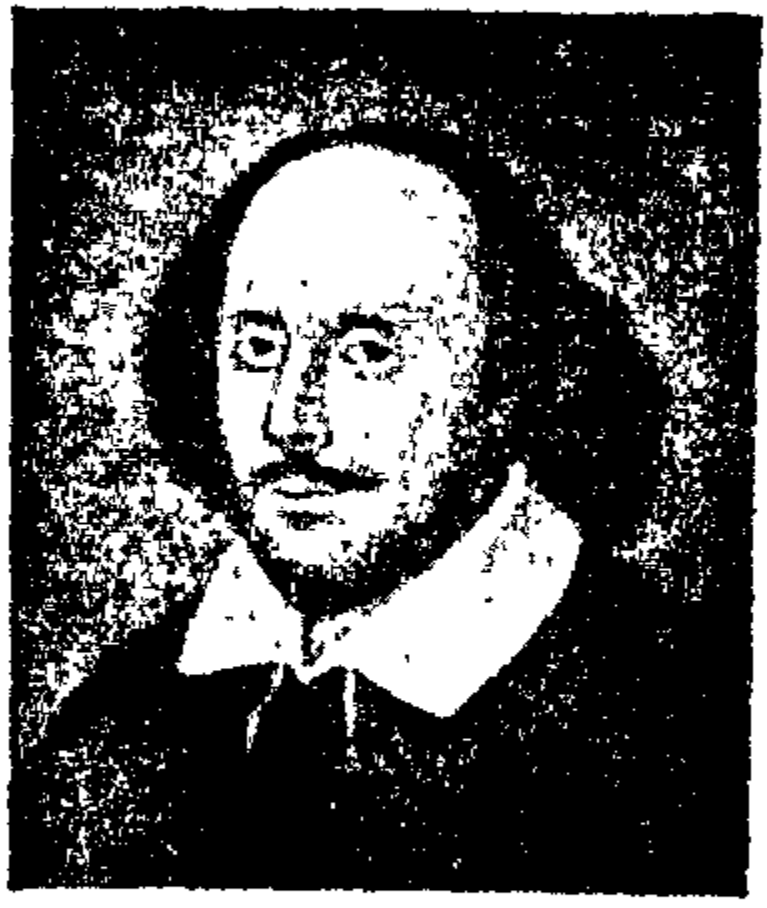
His father, John Shakespeare, was a well-to-do merchant, dealing mainly in skins for the manufacture of gloves. John Shakespeare had social ambitions, and in turn held the offices of Alderman, Bailiff, Chief Alderman, and Justice of the Peace. From 1571, however, his fortunes gradually declined. When William arrived at his seventh year he was sent to the Free Grammar School at Stratford.

SHAKESPEARE'S BIRTHPLACE, STRATFORD-ON-AVON

Schooling in those days was much more rigorous than it is to-day. Work commenced at six in the morning and went on till six in the evening, with only a break of one hour at noon for a meal and two short intervals of fifteen minutes each at nine o'clock and three o'clock. As a reward for such diligence and application to study, part of one afternoon in a week was allotted to recreation! Shakespeare left school in 1577 and helped his father in his business.

He must have had an extraordinary mind, record-

ing every impression he received, studying it and thoroughly understanding it before filing it away in some mental corner for future use. His daily contact with the natural surroundings of Stratford was later to stand him in good stead. Living amongst farmers, and hearing on all sides their constant references to



WILLIAM SHAKESPEARE

local folk-lore and the natural history of the country, was an education in itself. His plays contain many references which prove that his early contacts with nature all sank deep into his receptive mind.

In 1582 he married Anne, the daughter of Richard

Hathaway. Later, being in some danger of prosecution as a result of a day's hunting, he decided to leave home and went to London.

To a country lad of twenty-two fresh from Stratford, the sight of London town must have been a revelation to him. The crowds of passers-by, clad in brightly coloured silks, damasks, brocades and laces; the stately lords with their retinues of personal servants and armed retainers; the merchants shouting particulars of their merchandise; the sometimes quarrelsome and sometimes playful apprentices lounging round their master's doorway, but ready to do his bidding the moment he calls them; the state Militiamen in their accoutrements; the pedlars; sailors from the ships just returned from a voyage with Drake, swaggering along in their acquired finery and feathers; all this variety of colour and life was photographed, as it were, upon the mind of Shakespeare at once and retained for ever.

Before long, Shakespeare became connected with the theatre, at first in a very humble capacity. Another story of his leaving home tells that he joined the theatrical company of the Earl of Leicester in 1590. Be this as it may, Shakespeare was certainly a member of the Lord Chamberlain's theatrical company later, as his name appears on the list of actors. Their chief playhouses were the Globe (built in 1599) and the Blackfriars (1590), and here the plays he

wrote for the famous tragic actor Burbage were first performed. In the reign of King James I, the company became known as "the King's Men", and as far as can be seen, Shakespeare did not write plays for any other company for the remainder of his career.

By 1596 Shakespeare had accumulated riches, as he was a good business man and knew how to invest his earnings to advantage. Now that he was prosperous, his first thought was to return home and see what he could do to relieve the distress of his old father. In 1597 he purchased the largest house in Stratford, New Place, but did not go to live there till 1610. He died of a fever on his birthday, April 23rd, 1616, and was buried in Stratford Church. Over his tomb these lines were inscribed :—

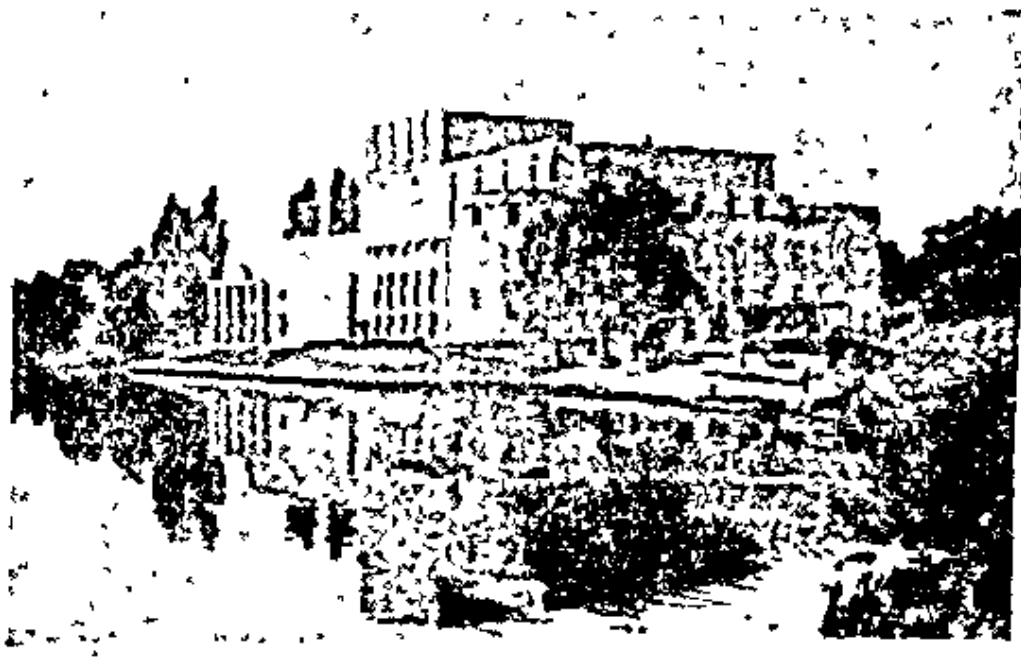
> "Good friend, for Jesus' sake forbeare
> To dig the dust enclosed here.
> Bleste be the man that spares these stones,
> And curst be he that moves my bones."

Needless to say, the grave of "The Immortal Bard" remains undisturbed to this day.

Shakespeare's birthplace in Henley Street, Stratford, was bought by his admirers in 1846 and is now a museum. New Place was bought in 1861, and the picturesque cottage of Anne Hathaway was given to the nation in 1892. A Memorial Theatre, where Shakespeare's plays were acted throughout the year, was built in 1870, but was destroyed by fire in 1926.

Since then a very fine theatre has been built on the site of the old one.

Now that we have considered the main features of the poet's life, we may turn to his plays of which he wrote thirty-nine in all. Some of them may already be familiar to you. The plays are divided into three classes: Histories, Comedies and Tragedies. Let us consider one of the tragedies, *Romeo and Juliet.* Here is a brief outline of the play.



SHAKESPEARE MEMORIAL THEATRE, STRATFORD-ON-AVON

The two chief families of Verona were the wealthy Capulets and Montagues. For many years these two families had been quarrelling, and at last it became impossible for a Capulet to meet a Montague any-

where without swords being drawn and bitter words and blows being exchanged.

One day Lord Capulet gave a great feast to all comers, except the Montagues. The son of Lord Montague, Romeo by name, was persuaded by some of his friends to go to the feast in disguise. He went, and soon set eyes on a very beautiful lady. They spoke together for some time and, with promises of further meetings, they separated. Each then made enquiries about the other. Imagine Romeo's feelings when he learned that the beautiful lady was no other than Juliet, the daughter of his father's greatest enemy. You can also imagine how Juliet felt when she learnt that her new friend was Romeo, the heir to her father's lifelong foe. Romeo went to his friend Friar Laurence, told him of his love for Juliet, and insisted on the priest marrying them. The Friar was astounded at the news. He quickly foresaw complications if the heirs of these hostile families were married. On the other hand, it might eventually put an end to the strife between them. This latter thought settled the matter in the Friar's mind, and he decided to marry Romeo and Juliet. The marriage took place, and Juliet went home to pass the long hours till it was possible for Romeo to visit her in secret.

Romeo and his friends were that day walking through the streets of Verona, when Tybalt, a cousin

of Juliet, taunted Romeo with insults and abuse. Romeo did not wish to quarrel with Tybalt, because he was Juliet's cousin. This led to a fight between Romeo's friend Mercutio and Tybalt. Romeo tried to separate them, but with no effect. Mercutio was soon killed by Tybalt and then Romeo could hold his

[By courtesy of Metro-Goldwyn-Mayer.

ROMEO AND JULIET BEING MARRIED BY FRIAR LAURENCE

temper in check no longer. He attacked Tybalt and quickly slew him The Prince was called to the scene, and after hearing the facts he sentenced Romeo to banishment from Verona.

This was indeed terrible news for the young bride

of a few hours, but worse was to follow ! Soon after Romeo's banishment Lord Capulet, not dreaming that his daughter was already married, proposed that Juliet should be married to the gallant Count Paris. Juliet pleaded with her father, but in vain. Lord Capulet was determined that she should obey him and marry the Count.

In her distress Juliet went to Friar Laurence and told him everything. The Friar wished to help her. He gave her a phial and told her to drink its contents the night before the wedding day. He warned her that the effect would be that, for twenty-four hours after drinking it, she would appear to be cold, lifeless, and in fact dead. He also warned her that when she was found to all appearances lifeless she would be borne in funeral procession to the tomb of her forefathers, where she would be left alone with the dead. In the meantime, the Friar promised to send messages to Romeo and arrange for him to be in the tomb when the effects of the potion wore off and Juliet awoke. Romeo could then carry her off to a distant place and they would be able to live happily ever after. But there is an old proverb which says "Man proposes but God disposes," and so it turned out in this case.

With many fears and misgivings Juliet drank the contents of the mysterious phial, gradually became insensible, and was, so far as could be seen, quite dead. In the morning the Count Paris arrived at the

Capulets' house with music and flowers for his bride, but alas, his joy was turned into mourning and his flowers were used to deck Juliet's funeral bier. The grief of her parents was terrible to behold. The splendid wedding feast became the burial meal, and instead of the priest to marry Juliet, a priest was needed to bury her.

But news travels fast, and Romeo heard of Juliet's death long before Friar Laurence's messenger could reach him to let him know that it was only a mock funeral and that Juliet was not really dead. He ordered his horses and immediately started for Verona. On the way he entered an apothecary's shop and for a bag of gold received enough poison to kill twenty men at one time. With this deadly poison in his pocket, and half mad with grief, he reached Verona at midnight. He went to the churchyard and found the ancient Capulet tomb locked and barred. He was about to break the lock with a crowbar when he was accosted by a voice which bade him, as a Montague, to desist from his unlawful purpose. It was the grief-stricken Count Paris, who had come to pray at what he thought was Juliet's tomb.

Romeo urged the Count to leave him in peace, but Paris, infuriated at the thought of a Montague desecrating the Capulets' tomb, fell upon Romeo with his sword. In a trice, Romeo's sword was drawn, and after a brief fight Paris lay dead on the ground.

[By courtesy of Metro-Goldwyn-Mayer.

THE FRIAR ARRIVES AT THE TOMB

Romeo now succeeded in opening the tomb, and carrying the body of Paris with him, entered this hall of death. There lay his lady, the fair Juliet, as rosy and beautiful as when he last saw her. Near her lay the body of Tybalt, whom Romeo had slain some days before. Poor Romeo! Not knowing the truth, he felt that his cup of sorrow was indeed overflowing, so he swallowed the apothecary's poison and was soon a corpse at Juliet's feet.

The Friar had now heard that his letter never reached Romeo, so, fearing complications, he too made his way to the tomb to take Juliet away on her awakening.

Juliet awoke from her trance and sat up on the bier. She saw the Friar standing near and asked at once where Romeo was. The Friar then told her how their plans had been thwarted, and said she must leave the tomb immediately. Hearing a loud noise outside, the Friar fled, leaving Juliet still sitting on the funeral bier. Suddenly she looked down at the stone floor and saw Romeo lying across the foot of her bier with a cup in his hand. She instantly guessed he had taken poison on discovering her in the tomb and believing her to be dead. Quickly unsheathing the dagger which she wore round her waist, she stabbed herself and died by the side of Romeo.

By this time the whole of Verona was aroused, and the uproar brought both Capulets and Montagues

from their beds. Even the Prince himself came out to learn the cause of the excitement.

Then before a great multitude, and in the presence of the Capulet and Montague families, the Friar related to the Prince the story of the love of the two children of the opposing houses, and its consequences.

The Prince, turning to Lords Capulet and Montague, severely rebuked them for their unreasonable enmity and showed them how Heaven had found the means to punish both of them for their unnatural hate. Then Lord Capulet asked Lord Montague to give him his hand, and called him brother, and they were thus reconciled. So did these poor lords, when it was too late, try to atone for the evil passions of hatred and jealousy which had ruled them in the past and now had brought disaster on them both.

This tragic and moving story is enriched by all that the loftiest poetic art and imagination could bring to its adornment, and it therefore takes high rank among Shakespeare's masterpieces. If this summary should attract you to the original, and to the rest of this great poet's work, you will find yourself in the presence of one of the world's wonders—an inexhaustible treasury of beautiful speech and thought.

QUESTIONS

1. When and where was Shakespeare born ?
2. Give a list of Shakespeare's plays that you have read.
3. Why is Shakespeare reckoned to be a Wonder of the Middle Ages ?
4. Give the story of Romeo and Juliet in your own words.
5. Who in modern India could in any way be compared to Shakespeare on account of the number of plays he has written ?

NOTES

versatility : great adaptability ; many-sidedness ; the ability to do many things well.

fertile : fruitful.

enthralling : fascinating.

diligence : industry.

damask : a rich silk fabric woven with elaborate patterns. Sometimes made of linen.

brocade : a silken texture of rich quality with a raised design.

retinues : attendants ; bodies of followers.

retainers : those who serve a person of high rank.

apprentice : one bound for a term of years to some craft or trade and accepting instruction in that trade for his services instead of wages.

Militiamen : soldiers enlisted for home service.

accoutrements : military dress and equipment.

swaggering : strutting about in a proud and defiant manner.

finery : showy clothes.

Lord Chamberlain : an officer of high standing in the royal household.

scruples : unwillingness or doubts.

complications : entanglements.

the effect of the potion wore off : the state of trance into which Juliet fell was gradually passing.

bier : the wooden framework on which a body is carried to the burying ground.

apothecary : one who prepares drugs ; a chemist.

crowbar : a bar used as a lever to raise heavy objects. A heavy blow from a crowbar would smash a lock.

desecrating : dishonouring or defiling a sacred thing or place.

SOME WONDERS OF MODERN MEDICINE

We are all liable to become victims of one or other of the many ailments to which the human race is heir. When we are ill, our first thought is to send for a doctor so that we may quickly recover our normal health, if it is at all possible.

The doctor visits us and tries to diagnose our illness, that is, he tries to find out what is wrong with our body. Having made up his mind about our ailment, he proceeds to treat us. Fortunately he has far more means at his disposal for curing us than his forefathers had. He has learned all the latest discoveries of medical men, and will not hesitate to use them so as to ensure an early alleviation of our aches and pains.

From the earliest days, the Ancient Egyptians, the Indians and the Persians were renowned physicians, but their methods would seem very crude to us nowadays. For hundreds of years the old methods were practised, and it was not till 1628 that William Harvey in England, discovered how the blood circulates throughout the body. This discovery of the circulation of the blood helped physicians to understand the workings of the body much better than they did before. It was left to Edward Jenner, an English doctor, to take the next step towards the modernisation of medicine.

Dr. Jenner, living in an agricultural district, noticed that farmers and others who had a lot to do with cows, never seemed to get smallpox, which at that time was a terrible scourge. On further investigation, he found that it was only those who had suffered from cowpox, a mild disease, who were saved from smallpox.

In 1796, Jenner inoculated one of his patients with some of the germs of cowpox, and after a slight fever, his patient was soon quite well again. Jenner thus prepared the way for his great experiment. He then inoculated the same patient, who volunteered for the experiment, with the germs of the dreaded smallpox. He was taking a great risk and he knew it. His townspeople also knew it, and they would have pulled his house down over his head, so infuriated were they at the risk he was taking with one of their fellow-citizens. They

EDWARD JENNER

were still howling outside the doctor's door, demanding his appearance, when the time for infection expired, and *nothing had happened* to the patient. He was in no danger and certainly had not developed smallpox. The previous vaccination for cowpox had saved him.

When Dr. Jenner announced this wonderful result to the mob, they were convinced of his sincerity, and from a raging mob of enemies they became an enthusiastic body of friends. Such is the fickleness of human nature! In six short years vaccination spread throughout the world, thus saving thousands of lives.

It has already saved many lives in India, where the dread disease is rampant at certain times of the year. But many more people should be vaccinated. This is

vaccinate those who volunteer for it. You will be doing untold good.

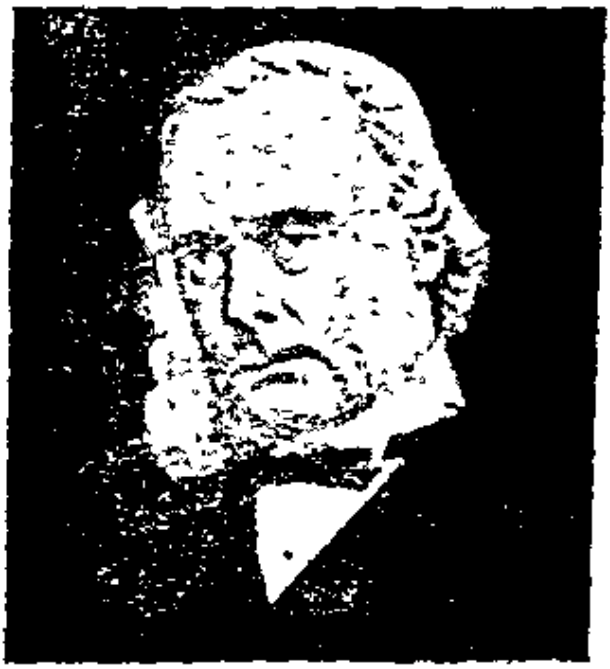
The next great advance in medical knowledge was the discovery of chloroform by Sir James Simpson. For many hundreds of years operations upon the body had been carried out without any anæsthetic at all. You can very well imagine how the necessity for undergoing an operation came to be dreaded by everyone. In course of time the use of ether had been introduced, and although the patient lapsed into unconsciousness there was no knowing when he would suddenly return to consciousness even in the midst of an operation. So it was felt that ether was unsatisfactory.

SIR JAMES SIMPSON

Simpson and his friends used to sit round a large table at night examining the many samples of anæsthetic sent to them by medical enthusiasts. They inhaled each sample in turn and made notes on it. One night, a special sample, received from

Germany some time before, was produced. Each person present inhaled this mysterious-looking liquid, and all immediately became unconscious. Dr. Simpson was one of the first to recover, and seeing his friends lying all around him his first thought, so he says, was "This is *much* better stuff than ether." The doctor experimented with the sample for some time, and was able to evolve a suitable anæsthetic for use in the most dangerous and complicated operations. The patient knew nothing of what was taking place, and eventually woke up in his bed with the dreaded operation over.

There was, however, one aftermath which very few escaped, and that was the danger of the wound becoming septic. This means that although the operation might be successful, the patient did not always recover because the doctors could not keep the wound fresh and clean and free from sepsis You, of course, know that the air we breathe



LORD LISTER

AN OPERATION IN PROGRESS

is full of microbes and germs, so every time the wound was dressed the air used to get at it, and in the absence of some antiseptic, the germs found their way into the wound.

Here was another chance to help humanity, and it was left to Lord Lister to take the chance. He suggested that carbolic acid should be used. He insisted on all the surgeons' instruments being cleansed with carbolic acid ; the surgeons' and nurses' hands were to be washed in it ; the patient's body was to be cleansed with it. Even the place where the operation was performed, and the doctors' and nurses' clothes were to be saturated with carbolic acid. Until the wound was healed carbolic acid was to be the means of keeping it and all its surroundings clean and wholesome.

These precautions brought laughter to the faces of Lister's fellow doctors and surgeons, but Lister was right. His methods achieved wonderful results. The deaths from operations were reduced to a minimum. Nowadays still more elaborate precautions are taken in all hospitals and nursing homes, resulting in a still lower percentage of failures.

Another pioneer of modern medicine was Louis Pasteur, who by his careful observation, under the miscroscope, of germs, parasites and bacteria, was led to remarkable discoveries. He traced out the germs of the dreaded anthrax, and his last work was the production of a vaccine that prevented hydrophobia, which is transmitted to man by the bite of a mad dog.

The discovery of radium by Professor and Madame Curie, followed by their researches into its nature and use, was an epoch-making event. Radium is a wonderful help in relieving human suffering. We might say that the very sight of it means destruction to the most deadly germs, so powerful is its effect. The gas from radium is sealed up in minute glass tubes, which are inserted in parts of the body afflicted by cancer; radiation

AN X-RAY PHOTO OF A HAND

from the gas goes through the glass, destroys the cancerous cells and helps to save the sufferer.

Doctors can examine any part of our body and see what is wrong. Should an operation be necessary, the X-ray picture is of the greatest use and help to the surgeon. He has not got to hunt for what *may* be wrong ; the X-ray picture tells him exactly what *is* wrong and he goes straight to the spot. The X-ray also helps the ends of justice. Articles belonging to suspected smugglers of cocaine, opium, and other dangerous drugs are exposed by the X-ray, and customs officers can at once see if drugs have been secreted. It is also useless for a robber to swallow his ill-gotten gains in the hope of putting them in a temporary safe place. The X-ray quickly reveals the hiding-place to the police, and coins, rings or other metal articles a robber has swallowed are subsequently recovered. You see, therefore, that X-rays are of use both to doctors and to the guardians of the law.

SIR RONALD ROSS

Another great discovery was that made by Sir Ronald Ross. He observed closely the habits of the female mosquito, and was able to prove eventually that it was the carrier of the malaria germ. This wonderful discovery has saved thousands of lives in tropical countries where the mosquito flourishes and malaria is rampant. It was also discovered that quinine, obtained from the bark of the cinchona tree, was a very valuable antidote to the malaria germ. In India especially, Sir Ronald Ross's discovery, and the use of quinine have brought untold relief to suffering humanity.

Another section of the world's sick, those suffering from diabetes, were given fresh hope when a Canadian doctor, Dr. F. Banting, together with several helpers, discovered a drug which he named insulin. It was very successful and many persons have been saved by its use. Unfortunately, Sir Frederick Banting was killed in a flying accident in 1941 while working for the medical relief of suffering caused by the world war.

We must now mention the sulphanilamide group of drugs recently discovered, which brings hope to those suffering from pneumonia. It is already responsible for the saving of innumerable lives.

Last but not least comes the great discovery made by Sir Alexander Fleming. It is the mould known as *penicillium notatum* which destroys deadly bacteria. It is stowed into culture flasks. After ten days' incubation

DR. GANAPATI STOWING PENICILLIN AT THE HAFFKINE INSTITUTE, BOMBAY

at a certain temperature each bottle contains about 15,000 units of penicillin. It takes the contents of about a hundred of these bottles to produce enough penicillin of good quality to treat one single case. In the picture the stowing is being done by Dr. Ganapati of the Haffkine Institute, Bombay.

Suffering, suffering, and still more suffering. The world is full of suffering, and yet our doctors go on with their experiments to relieve suffering. Who will dare to say they have not been successful? What would our forefathers have thought of their discoveries? They would never have believed them possible.

We should be very grateful to the busy doctors who are always on the look-out for new methods of curing disease. May they live long and be rewarded by the thanks of countless sufferers! Their names will live for ever with those of Simpson, Lister, Curie, Harvey, Banting, Fleming and all the others who have, as you have seen in this lesson, snatched some of his most dreadful weapons from the hand of Death.

QUESTIONS

1. What did Dr. Jenner do for the cause of medicine?
2. Name the discoveries of Sir James Simpson and Lord Lister. How do they benefit humanity?
3. Name some of the discoveries of Dr. Louis Pasteur.
4. What is radium? Who discovered it? Give an account of some of its benefits.
5. In what way does the work of Sir Ronald Ross benefit us?
6. Who discovered penicillin?
7. Would you like to be a doctor? Give your reasons.

NOTES

crude : lacking refinement; unfinished.

inoculate : to insert germs into the body through the skin in order to prevent diseases.

volunteer : to offer oneself of one's own free will.

ether : a liquid used as an anæsthetic.

septic : poisoned by bacteria getting into a wound

sepsis : see "septic."

parasites : *a germ which lives upon other germs.*

bacteria : a very small kind of fungus or growth found in liquids and the cause of certain infectious diseases.

anthrax : an infectious disease of cattle and sheep which can be communicated to man by a scratch or a breach in the skin.

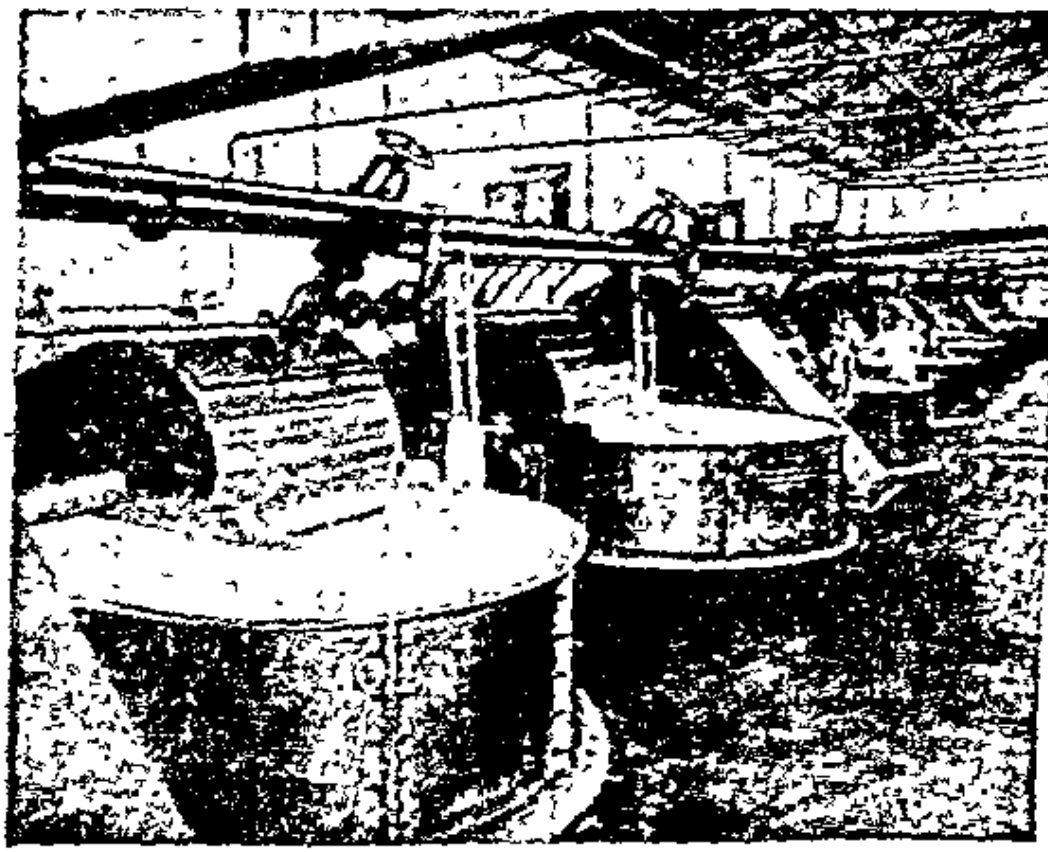
hydrophobia : a dreadful disease caused by the bite of a mad dog. Another name for it is rabies.

radium : *a substance found in very small quantities in uranium* and pitchblende. Pitchblende=a dark lustrous mineral found in Bohemia from which uranium and radium are obtained.

smugglers : those who bring dutiable articles into a country by secret and illegal means.

rampant : unrestrained ; aggressive.

The paper machine consists of a long sheet of wire fabric, on to which the pulp flows, and this wire is shaken to and fro all the time to intertwine the fibres, whilst the water drops out of the pulp through the wire. The wet sheet then passes over a suction-



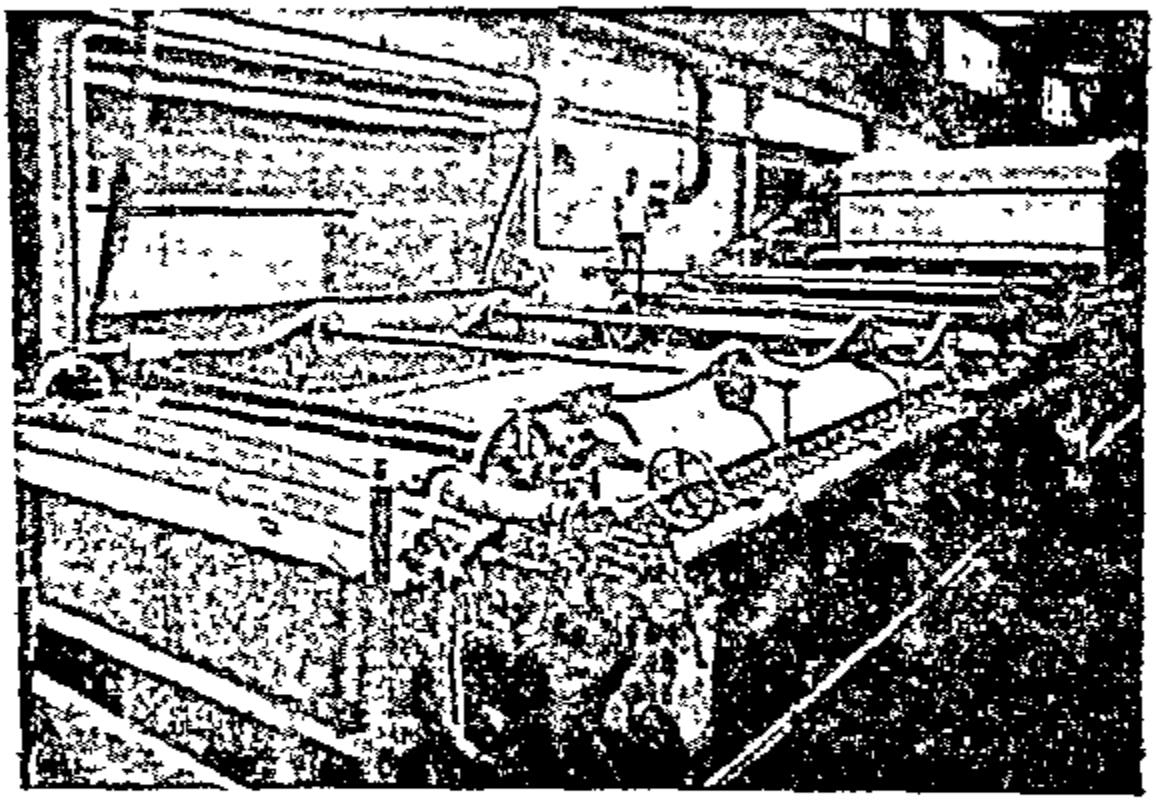
[By courtesy of the Tullybar Paper Mills.

THE BEATERS

box which draws any remaining water from it and locks the fibres. It then passes under heavy rollers which press it, and after through big drying cylinders filled with steam. When a glossy surface is required

the paper is also pressed between a number of steel rollers.

The largest paper mills in India are the Titaghur Paper Mills near Calcutta. Some large mills can make about 3,000 maunds of paper in one hour. The paper that is used for newspapers is generally deliver-



[By courtesy of the Titaghur Paper Mills

A PAPER-MAKING MACHINE

ed to the press in large rolls. Other papers are cut into standard sizes, and then packed into reams, each ream generally containing 500 sheets.

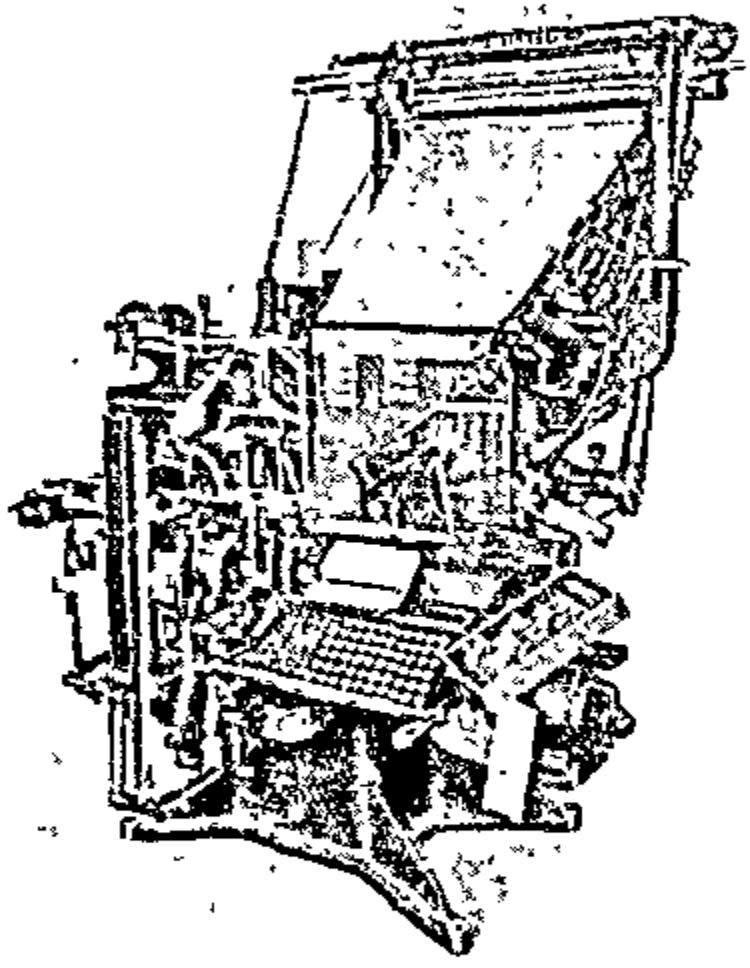
There are many kinds of paper each intended for a special purpose, for printing, covers, wrapping, writing, blotting, typewriting, duplicating, etc. No

that the paper is ready we can proceed with the production of a book.

The author first sends his manuscript to a publisher. When the publisher agrees to undertake the publication, terms are settled and the publisher sends the manuscript to a press for *casting off*. This means the printer has to find out how many pages the manuscript will make in print. At this stage, the size of the paper and the types to be used are decided on. After casting off the manuscript the press sends its estimate for printing. The publisher adds to it the cost of paper, binding, royalty to author, publicity, and his own profit, and then provisionally fixes the price of the book.

The production of the book now begins. The first process in printing is the composition. The manuscript is composed or set in types. Either it is done by hand by compositors, or by Intertype, Monotype or Linotype machines. An illustration of an Intertype machine is given on the next page. The operator sits in front of the keyboard, which is somewhat similar to that of a typewriter, but much more complicated. On the left side is a furnace in which the lead is melted. When the operator presses the keys on the keyboard, an impression is made on the soft lead. As soon as the line is completed, the leaden line of type, or slug as it is called, drops down a slot at the left, and is ready for assembling.

The composed lines are then put together and a proof is taken. This proof is sent to the author, who *corrects it. The proof then comes back to the com*positors, who alter the types according to the correc-



AN INTERTYPE MACHINE

tions. The composed lines are then arranged into pages, with the blocks of illustrations, if any. Proofs are taken of these pages, which are again sent to the author for his final reading. After these c[illegible] are carried out by the compositors, the [illegible]

imposed (*i.e.*, the sections of sixteen pages each are so arranged that they will appear consecutively when bound), and are locked up for the printing machines.

There are different kinds of printing machines: some are Double Crown, Double Demy, etc., according to the size of the paper used. The imposed forme is then sent to that machine which tallies with the size of paper we are going to use for the job. The machineman then securely locks up the forme on the bed of the machine, and after inking, sets the machine in motion by switching on the electric current. Some machines have automatic "feeds", *i.e.*, they take up each sheet of paper by themselves; others have to be "fed" by the machine-man.

The kind of paper used varies as to its finish and thickness. Super-calendered or glossy paper is required when halftone blocks of illustrations are used, while machine-finished paper is generally used when there are either no blocks or only line blocks. Antique feather-weight paper is sometimes used, but not for block work.

It is interesting to note that as many as 2,000 sheets or more of paper (16 pages to a sheet) can be printed on a machine per hour. When the printing of one side of the paper is finished, the paper is put through the machine again and the other side is printed. So we get on each sheet of paper two sets of 16 printed pages.

The machine-man must be all attention whilst the printing is going on. He must see that the ink is uniform everywhere on the sheet, that the blocks (pictures) are coming out well, that the rollers are working properly, that the paper is not being torn or soiled, and that the types have not fallen out. In fact, much of the result of good printing depends on the judgment and skill of the machine-man.

Besides the big printing machines mentioned above, there are smaller machines called treadles, which are used in printing the covers of books, letter-heads, envelopes, etc.

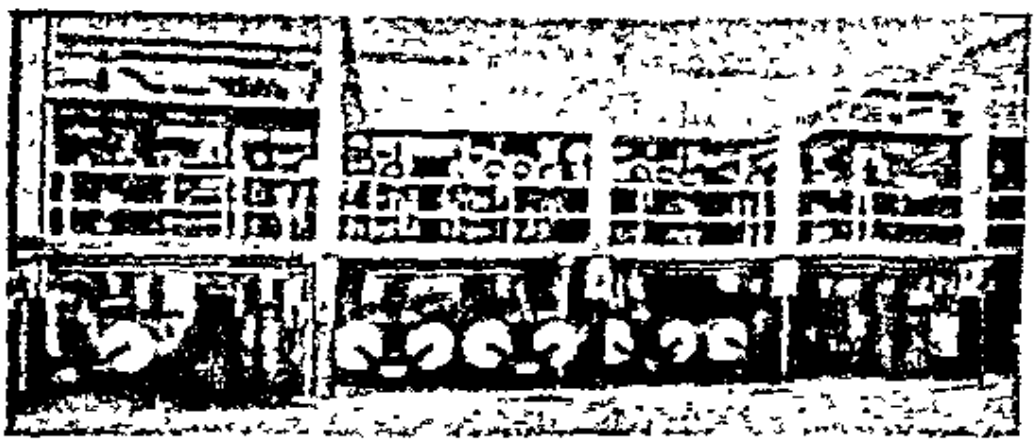
The covers of school books can be of three kinds, namely, paper, paper pasted to boards, and full cloth. Cover papers are available in different colours, sizes and thicknesses. Different coloured cloths are also used.

After all the formes (sheets) are printed, they are sent to the bindery. As in the case of printing, there are different processes in the work of binding. First of all the sheets, which have already been numbered or lettered, are folded according to the size of the page. Then the formes are "gathered", that is, they are arranged consecutively. When this is done, they are either stitched by machine or sewn together by hand. Then the covers are put on and the formes assume the appearance of books. If they are only paper-cover or paper-board bound books, they are sent to the

ting machine for trimming. After trimming, they are counted, packed in bundles and sent to the publisher's office. For books with full cloth binding, the formes are first sewn and then trimmed ; afterwards they are sent to the duftries for attaching the full cloth cover.

The publisher's office is the main source of distribution of books. The " trade " consists of the booksellers, who send their orders to the publishers for their requirements, and it is the publishers' business to see that the booksellers are supplied with what they want. During the season, the publishers' and booksellers' offices are scenes of the greatest activity, as you most probably know.

Now that you know something about the way a book is produced, and how the paper used in it is made, you will realise that the work is not something



[R. Hoe & Co., Ltd.

A NEWSPAPER ROTARY PRESS

that can be done in a few hours or by the mere wishing. Hours and hours of skilled workmen's time went towards the making of the book you now hold in your hand, and should any of your friends be unable to buy a copy of a book because it is being "reprinted", do not let them get angry or impatient. Just give your friends some idea of how a book is made, and they will understand and make allowances for temporary lack of stock.

For the production of newspapers, fast rotary machines are used. The type face that prints the newspaper is on the outside surface of a revolving cylinder, that is why the machines are called rotary machines. One of these wonderful presses will print, cut, and fold a hundred thousand copies of a sixteen-page newspaper in an hour.

Just consider where education and literacy would be if the printing press had not been discovered, and paper had not been thought of. Perhaps we could go so far as to say that all progress in this world has depended on the printed word, and on the facilities for obtaining good supplies of paper. Thus paper and the printing press have readily made available for you the cream of the world's literature, and have given you some of your closest friends in the shape of books.

QUESTIONS

1. Trace the history of paper and say briefly how it is made.
2. Write a short essay on how a book is produced.
3. How does one get a book after it is printed ?
4. How are paper and the printing press responsible for the *spread of education and literacy ?*
5. What would you say is the style of binding used for this book ?

NOTES

pulp : a *soft moist substance.*
caustic soda : a corrosive substance.
bleaching powder : chloride of lime.
alum : a mineral salt with a binding tendency.
sizing : a thin solution of glue.
vats : large tanks for holding liquids.
intertwine : to twist together like basket work.
manuscript : a document written by hand or typewritten.
royalty : a payment made on sales by a publisher to an author.
publicity : making known ; publishing information about a person, place or a book ; advertising.
provisionally : *temporarily ; for the time being.*
consecutively : *in succession, one after the other.*

One of the earliest pioneers of wireless was James Lindsay. He foretold that electricity would become a general means of illumination, that it would replace steam and also prove to be a substitute for coal for heating purposes. He devised an electrical telegraph in 1832, produced continuous electric light in 1838, proposed means for a submarine telegraph in 1843, and accomplished wireless telegraphy through water in 1858. The above details are taken from a Memorial erected to his memory in the city of Dundee.

After Lindsay came Clerk Maxwell, who spoke on wireless telegraphy before the Royal Society. The theories he then put before that learned body were subsequently proved to be quite correct. In 1887, Hertz transmitted wireless signals across a large hall by means of what were known as Hertzian waves. Sir Oliver Lodge in England and Branly in France also experimented with these Hertzian waves.

About this time a young boy, Guglielmo Marconi by name, was undergoing his education in Italy. When only twelve years old, he was keenly interested in wireless. After making many experiments, he decided to leave his native land of Italy and go to England for further experiments.

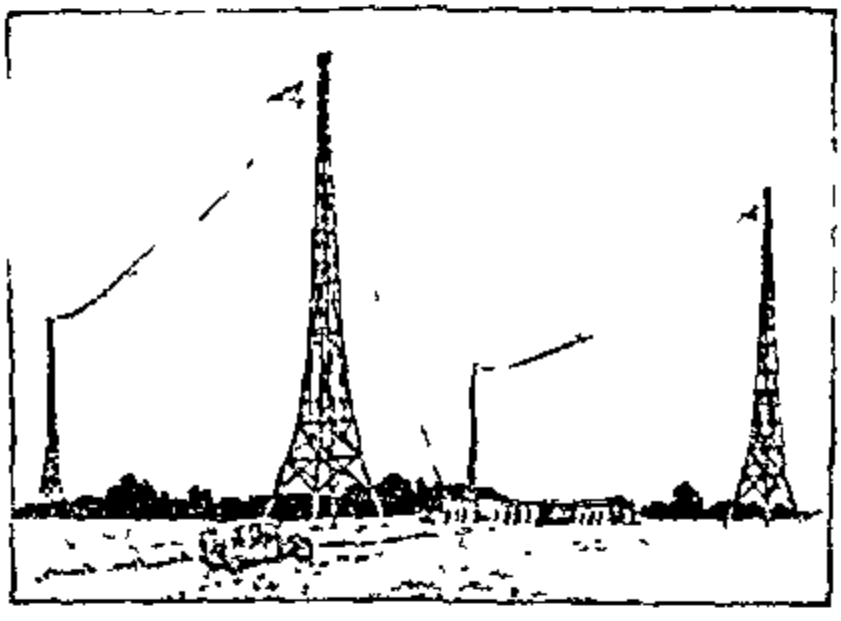
On his arrival in England he was warmly welcomed by Sir William Preece, who was himself a

enthusiast. Marconi took out his first patent rights for wireless telegraphy in 1896. This action resulted in a number of persons claiming that they had already done all that Marconi had done, and that they had prior rights to the patent. Nothing daunted, Marconi went on with his experiments as before. The British Admiralty had already been studying Marconi's invention, and fully understood its great importance. They now offered Marconi the sum of £20,000 for the right to use his invention on the ships of the Royal Navy, and at naval stations ashore.

MARCONI

When our young inventor announced that his next great experiment would be to send wireless messages across the Atlantic, people laughed at him. Marconi, however, was so convinced of his success that he began to build a large wireless station in Cornwall. It had twenty masts 210 feet high. When this station was ready, Marconi left it in trustworthy hands, and with two assistants, Mr. Paget and Mr. Kemp, set sail for Canada, where they landed at St. John's, Newfoundland.

Marconi did not intend building any towers or making elaborate arrangements in Newfoundland, but had decided to send up his wires with the help of kites. The first kite was sent up on December 10th, but the wind was so strong that the wire broke in two and the kite drifted out to sea. He next tried a balloon filled with hydrogen. It had hardly reached the limit of the wire which held it when it, too, broke away.



A WIRELESS STATION

Now, before leaving England, Marconi had told his assistants in Cornwall that as soon as his arrangements in Newfoundland were complete he would cable them, and in return they were to telegraph the letter S in the Morse code. He now cabled to Cornwall that the signals should begin at three in the afternoon and continue till six in the evening.

The 12th December was a bitterly cold day, and the wind was blowing a gale. Even the sea was

raging with redoubled fury against the rocks below the house where the inventor was staying. Marconi and his companions, however, managed to send a kite up four hundred feet. With the greatest difficulty the wire was fixed in position.

It was half past three in the afternoon, and Marconi sat with the receiver to his ear, eagerly waiting for some sign. At last, very faintly at first, he heard a tapping noise. He listened intently for some time, and then smilingly handed over the receiver to Mr. Kemp. Mr. Kemp put the receiver to his ear and immediately heard the three little clicks that spelt the letter S in the Morse code. Again and again came the signal, and the inventors looked at each other with relief as they realised that once again Marconi's theories had proved to be correct. For three whole days they waited whilst the signals were repeated and then Marconi published the great news to the press and to the world at large.

From that time onwards, wireless telegraphy progressed very rapidly. Huge and powerful stations have been constructed in all the important countries of the world ; in fact some countries have a number of powerful stations which are in active use day and night.

At first, wireless communication was only by telegraphy ; various developments eventually made possible telephony by wireless, so that it is now possible

to transmit speech, music, and any other sound by wireless. Wonderful Broadcasting stations, beautifully furnished for the convenience of those who broadcast, are busy in sending over the ether a selected programmes of songs, music, talks for villagers, talks for the educated, household hints, lectures, instructions for schools, etc., at fixed times throughout the day. In India we have broadcasting stations at Delhi, Calcutta, Bombay, Madras, Lucknow, Trichinopoly, etc., and in Pakistan at Karachi, Lahore and Dacca. Many of us are owners of a receiving set, and very

[By courtesy of All India Radio

"THE VILLAGE HOUR"

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[*By courtesy of All India Radio*

"THE VILLAGE HOUR"

(Marconi's Wireless Telegraph Co., Ltd.

WIRELESS ROOM IN A BRITISH LINER

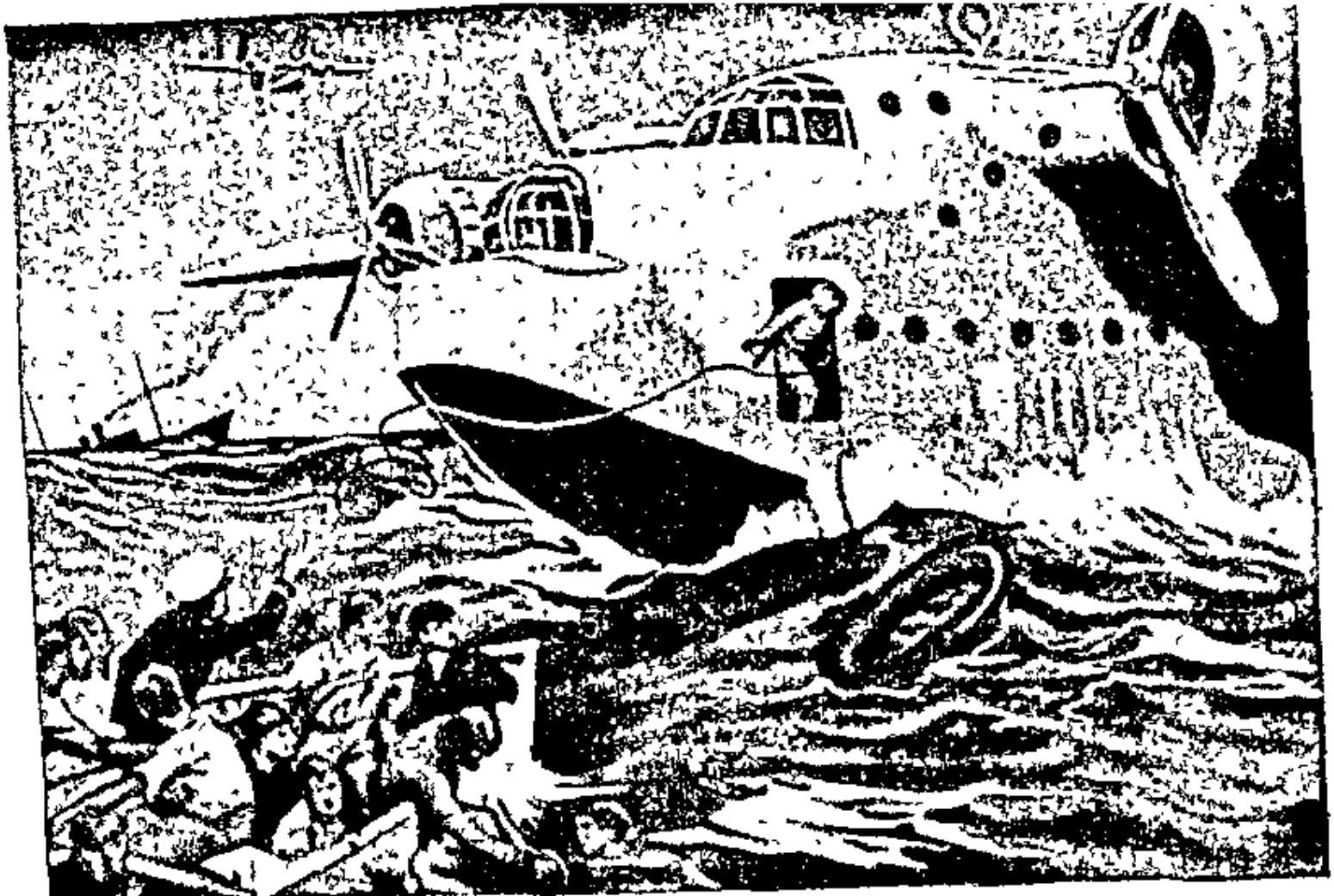
proud of it we are. In England and America, it is estimated that about one person in every eight is the owner of a receiving set.

Nearly every ship which sails upon the ocean has a wireless transmitting and receiving station aboard. Many wonderful rescues at sea have been possible only by the use of wireless. If a disaster occurs, the wireless operator of the ill-fated vessel immediately signals "S.O S." in the Morse code, which means "I am in great distress, come to my assistance at once." He also states the exact position of the ship, so that other ships can see if they are able to reach the wreck in

time. Those nearest to hand immediately wireless a reply that they are making for the spot at full speed, and in most cases they are able to reach the vessel in time. Sometimes, however, the ship has been so badly damaged that it sinks before help can arrive. The rescuers, however, still proceed at full speed in the hope of picking up some survivors in the sea, or other would-be survivors in the ship's boats. Alas, it is sometimes the lot of the rescuer to find no trace of the ill-fated vessel, ship's boats or survivors, but merely a few pieces of wreckage and traces of oil on the waves.

Aeroplanes also carry wireless instruments. During the war a large passenger steamer was sunk by an enemy torpedo. Most of the passengers were able to reach the boats, and soon afterwards the ship disappeared beneath the waves.

The ship's boats became separated, and one boat was for a long time at sea, drifting and drifting, without any hope of rescue. The brave passengers were about to give up in despair and weakness when to their amazement they heard the drone of a large aeroplane overhead. They signalled to the aeroplane with the poor means at their disposal, a young boy scout distinguishing himself in this work. Soon the plane sighted the drifting boat and saw the signals the wretched passengers were making. The plane swooped down as low as possible and the pilot made



[*By courtesy of the Bristol Aeroplane Co., Ltd.*

A "BRISTOL" PEGASUS-ENGINED FLYING BOAT RESCUING SHIPWRECKED PASSENGERS

the people understand that help would be brought. He was as good as his word. Very soon a large ship came in sight, and in a few hours the shipwrecked people were once more in warmth and comfort, saved by the invention of Marconi !

In rescuing shipwrecked people the seaplane is even more useful than the aeroplane. Why is this ? Because the seaplane is built so that it can float on the sea, whereas the aeroplane sinks as soon as it touches the water. In the picture you will see how easy it is for the seaplane to effect a rescue. It majestically rides the waves whilst the crew throw out strong ropes to the survivors whom they have come to rescue. Needless to say every seaplane carries a wireless set.

The work of tracking the criminal is greatly helped by wireless. Some years ago a notorious criminal in England tried to escape by fleeing to America. It happened that the liner on which he travelled was a very slow boat, but he was happy in the belief that, having left England's shores, he was quite safe from the clutches of the law. It turned out that soon after he sailed, the clever detectives of Scotland Yard discovered his guilt and on going to his house to arrest him, they found that "the bird had flown." They soon learnt where he had flown and by what means. A famous detective then got into wireless communication with the captain of the vessel on which the wanted man was a passenger. On being told the whole story,

the captain promised to keep an unobserved watch on the passenger. Then the detective set sail for America on a very fast liner and landed there some hours before the other boat was due to arrive. The detective was able to board the incoming vessel with other officials and in a few minutes the much-hunted criminal was under arrest. Then the return journey began. After a sensational trial the prisoner was convicted and sentenced to death. Thus you see how wireless helps justice. Many police forces use police-cars fully equipped to receive wireless messages from their headquarters, thus enabling them to get swiftly on the heels of the escaping criminal.

There can be no doubt that wireless has exerted the greatest influence for good over many thousands of lives, especially in India, where our villagers look forward to the daily programmes broadcast in their mother tongue. It is to Guglielmo Marconi that we owe these remarkable achievements—these many wonders and amazing new powers placed at the service of man. May they always be used for the progress and happiness of the human race!

QUESTIONS

1. Who were the pioneers of wireless? Who was the greatest of them all?
2. Give a short account of Marconi's experiments.
3. State briefly some of the benefits which mankind has derived from this wonderful invention.

4. What is the meaning of the letters "S.O.S." ? In what circumstances are they used ?
5. If you have a wireless set in your house state the names of the broadcasting stations whose programmes you enjoy most. Give your reasons.

NOTES

Royal Society : its full title is The Royal Society for Improving Natural Knowledge. *It is the oldest scientific society* in Britain.

broadcasting : send out by wireless a programme of instruction, music or entertainment.

sending out the ether : broadcasting by wireless.

clutches of the law : the power of the law ; the hands of the police.

"the bird had flown" : the suspected person had escaped.

THE CINEMA

Most of us visit the Cinema very often. It is with interest that we glance through the daily announcements in the newspapers and then make up our minds which picture we should like to see. Perhaps our favourite actor or actress is appearing, and we never miss a picture in which he or she is acting. We certainly enjoy going to the pictures with our friends.

Some of us prefer historical pictures, produced with all the wizardry of the ingenious director who thoroughly understands his subject, and who knows exactly what he wants to portray on the screen. Some of us like to see travel pictures which take us from one country to another, and give us an insight into the manners and customs of different peoples. Others, again, find their chief pleasure in comic pictures, such as those made by Charlie Chaplin or Laurel and Hardy. Whatever the category of pictures we prefer, do we ever wonder how the picture is produced? Do we realise how many people are necessary behind the scenes for the successful screening of a picture? Camera men, make-up men, electricians, scene-shifters, carpenters,

builders, wardrobe-keepers, and many others are indispensable. It may help us to appreciate more the efforts of the makers of the " movies ", if we watch all these people at work.

The place where a picture or film is made is called the studio. The studios of important film companies

[*By courtesy of Metro-Goldwyn-Mayer.*

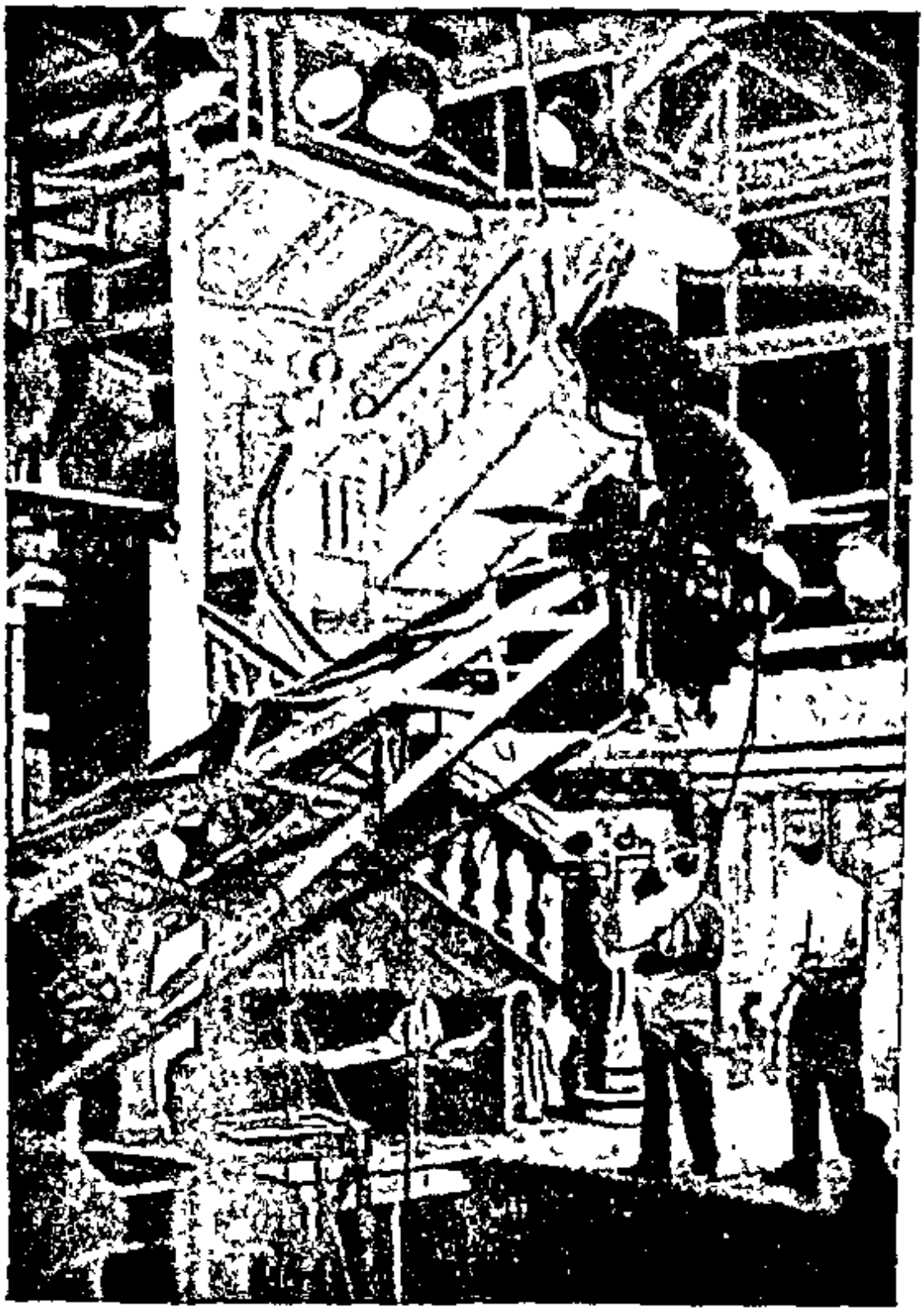
LAUREL AND HARDY

consist of large buildings covering acres of ground. These buildings contain stages, and each stage is numbered and is reserved for the production of a particular picture. The stage can be enlarged or made smaller by opening or closing large sound-

for when the stage is ready it must be absolutely sound-proof.

When the making of a picture is about to commence, the stage intended for the production is taken over by a large number of workmen whose duty is to carry out the orders of the producer. The background for the first scene of the picture has to be prepared—it may be a castle or a cottage, an ancient street or a modern restaurant interior. The men get to work and soon unfold before our eyes exactly what the producer has ordered. Carpenters, painters, plaster-workers, electricians, all do their share, and the scene is made to look as realistic as possible. A company of actors can, of course, be taken to the desert or a mountainous country to enact their parts if the picture requires such a location, and this is usually done for outdoor scenes ; but for other purposes the required setting is built up on the stage itself.

When all is ready and " the set ", as it is called, has been approved by the stage manager, the electricians arrive and proceed to fix up the huge lamps which are to make the scene as bright as day. Some lamps are on stands, some hang from the roof of the stage, others are on movable cranes which can be set to throw the best possible light on the scene, and can be moved from left to right or from right to left as the actors and actresses move about the stage These lamps are so powerful that the heat generated by



FILMING A SCENE WITH GRETA GARBO

them keeps all the workers continually perspiring. The greatest care is taken to see that the lamps are kept well out of the picture. When the lights are quite ready, the actors and actresses come on to the set, all in their appropriate costumes.

On the end of a long steel rod hangs the microphone. It can be turned swiftly in any direction. Then a large box on wheels is pushed on to the set. This is the camera in its sound-proof case. This wonderful machine can be moved in any direction necessary to follow the movements of the players.

When the director of the picture is satisfied that all on the set are ready to begin playing, he says "Shoot", and the camera at once begins to record the action of the picture.

While the camera is busy recording the picture, the microphone overhead is busy picking up the sounds which are coming from the stage. Each sound causes a disc at the centre of the microphone to vibrate, the different sounds making vibrations of greater or lesser intensity. The vibrations are converted into an electric current, which controls a mirror on which a lamp shines a thin line of light. Reflected from the mirror, the line of light falls upon the unexposed negative or film which is passing through the sound machine at exactly the same pace as the unexposed negative is passing through the camera. The difference between the two is that the film in the

camera is being impressed with the actual picture, whilst the film in the sound-box is being impressed with the sounds only, thus making a sound-track of exposed film. The whole process is very technical, but I think I have told you enough to make the matter fairly clear to you.

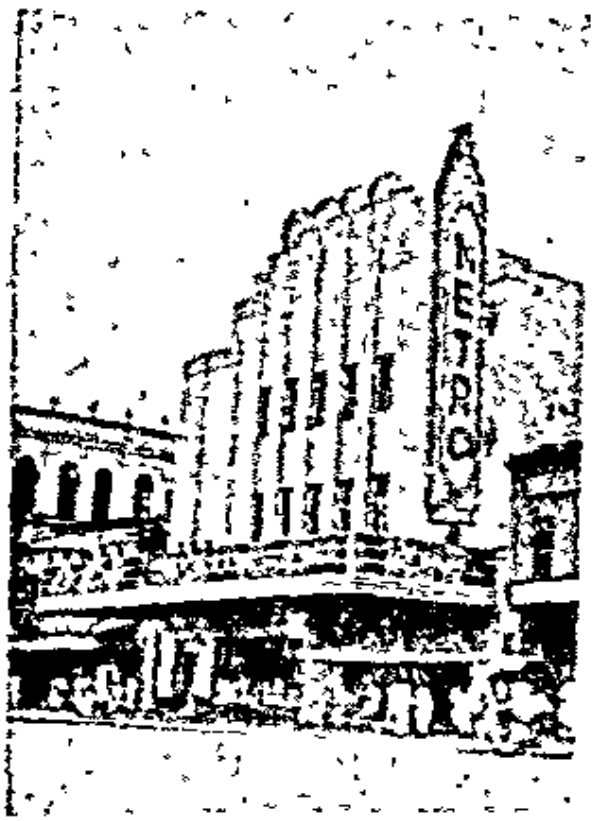
When the recording is finished, the photographic negative and the sound negative have to be printed together on one wide film. So when the "shooting" is over, the camera-man and the man in charge of the sound-box take the negatives to the developing rooms, where the films are quickly developed. Before we go any further I had better explain, once again, that the term "shooting" refers to the actual filming of the picture, and not to any display of firearms!

Later in the day, when the director has some time to spare, he goes to a little room in which is a miniature screen, with a few rows of seats just as in a cinema. Perhaps some of the leading actors and actresses accompany him, anxious to see the result of their day's work.

If the director is satisfied, the length of film taken that day is sent to the laboratory to await further instalments until the whole of the film has been completed. The pieces are then fitted together and edited —that is to say, anything unnecessary or unsatisfactory is taken out. When the final film is passed, hundreds of copies are made and sent all over the

world, so that "film fans" in distant parts may not be kept waiting for a sight of their favourite actor in his latest thrilling performance.

The home of the film industry is the United States of America, particularly the State of California. That part of the country is ideal for the production of films because it has a bright sunny climate. You are all acquainted with the names of the principal companies making films, such as Metro-Goldwyn-Mayer, Paramount, Universal, etc. Very good pictures are made in London, Denham and other centres in England.



[Photo C. A. P.
A CALCUTTA CINEMA

In India we have a number of film companies producing very interesting films in Indian languages. Epic stories, historical plays, and social dramas are all successfully dealt with by our film producers.

The cinema is an outstanding wonder of this modern age. Apart from the great

pleasure it gives us as a means of entertainment, it is in many ways an education in itself, and no regular patron of the cinema can ever be called illiterate.

The cinema is also a very valuable asset to educationists in imparting knowledge. The film companies from time to time produce historical pictures, as you have read above, and these pictures are of great assistance to the teacher of history. A couple of hours spent in the company of historical personages dressed in the proper dress of the period can teach us far more than we can learn from a whole week's browsing of an historical textbook. Even some of Shakespeare's dramas and comedies have been filmed, and we thereby gain a much better idea of the play than would be possible from a casual reading of it.

But of far greater importance is the use of the film in the teaching of science and industry. There are educational film companies which devote their time to the filming of the habits and customs of animals, insects, fishes, germs, and numerous other branches of scientific life. We can see the hatching of the eggs of fish and their gradual development into large fishes; we can watch the unceasing activity of many kinds of germs and their effect on water, milk, or blood. We can watch the opening and closing of flowers and leaves, and the growth of grass and weeds. All these actions and movements are greatly magnified on the

screen. Such pictures are intensely interesting, and are a very great help in the cause of education.

QUESTIONS

1. Describe your favourite cinema and give your reasons.
2. Give in your own words a description of how pictures are made.
3. How are the sounds recorded ?
4. Who are your favourite film stars ?

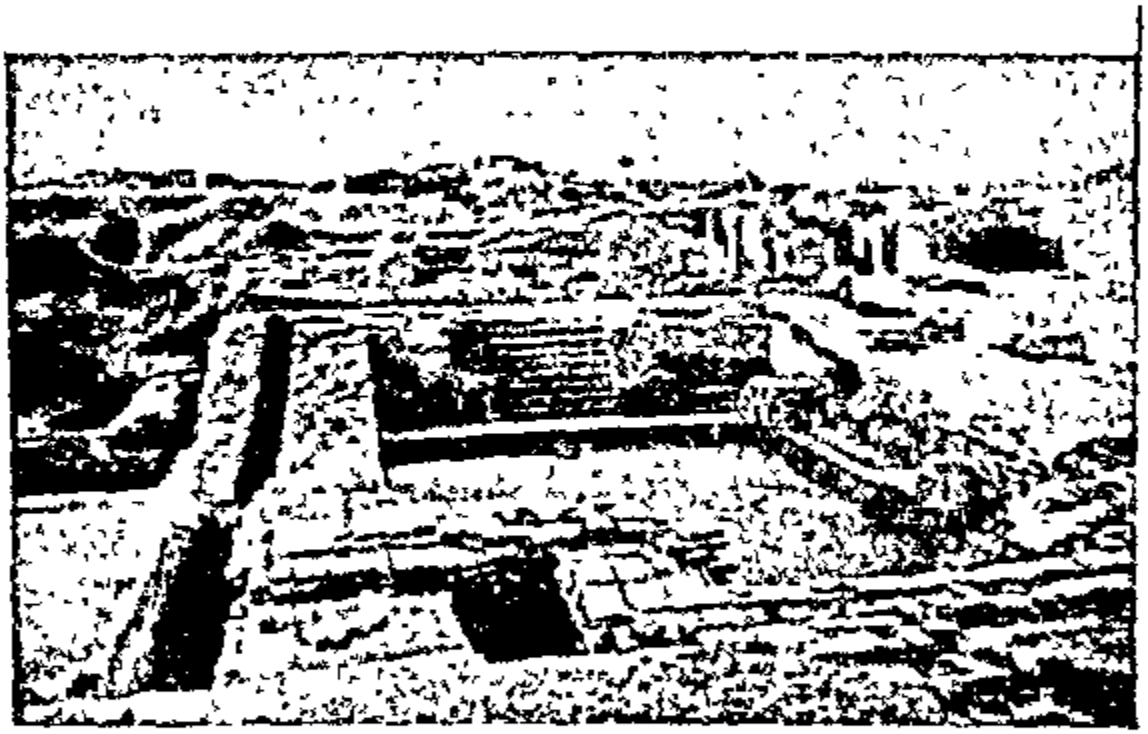
NOTES

wizardry : magic.
category : class ; division or heading.
wardrobe-keepers : *those in charge of the costumes.*
location : place ; position.
crane : machine for raising or lowering heavy weights.
vibrate : *to tremble ; to make a quick quivering movement.*
amplified : increased.
instalments : parts received at intervals.

INDIA, THE LAND OF WONDERS

India is a land of so many wonders that we shall only have time to consider a few outstanding ones. We will endeavour to study them, in proper sequence as far as possible.

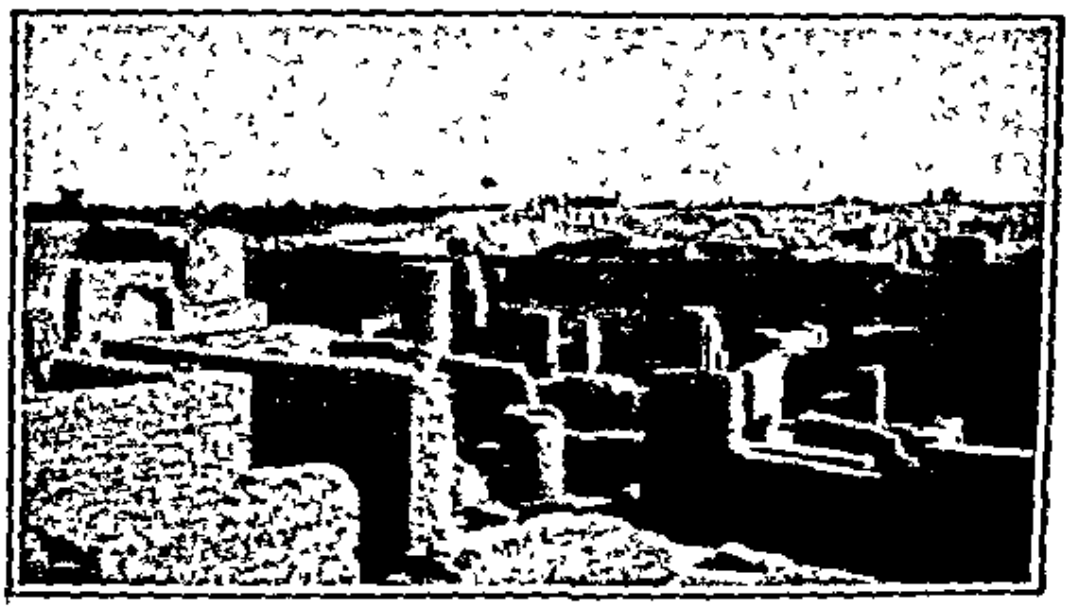
Many years ago, about 2,700 B.C., there existed a flourishing city in Sind. Its rulers and people were



THE GREAT BATH AT MOHENJO-DARO

very clever and highly civilised. Even in our own day there are hundreds of towns and villages in India which know nothing of sanitation or town planning. Yet nearly five thousand years ago, those ancient people of Sind were experts in such matters. How do we know this ? The members of the Archæological

Department of the Government of India discovered the ruins of a city which they named Mohenjo-daro, or the Mound of the Dead. When many layers of earth had been removed, extensive ruins were laid bare. The greatest wonder in these ruins is the Great Tank or Bath. The excavators discovered that it was forty feet long and twenty-three feet wide. At



EXCAVATIONS AT MOHENJO-DARO
Note the well linings left standing.

either end an imposing flight of steps, once covered with wood, led down to the water's edge. There was a drain so that the tank could be emptied. There was even a manhole so that the drain could be inspected properly.

The ruins of many broad streets have been uncovered. There are blocks of well-built houses with

stairways leading to upper rooms, and all the houses have bathrooms and underground drains. Street drains and water chutes were provided to enable the rain to get into the drains and thus prevent flooding, an evil which is by no means absent in modern India. Drains were everywhere.

All this proves that our ancestors of Sind had very advanced ideas of municipal administration. The spacious and well-planned houses point to a civilisation far in advance of that of Egypt of the same period. Although Sind is no longer a part of India, we are proud of our ancestors who lived there centuries ago.

Town planning and drains, although so important, are not very romantic things to read about. So let us now consider another aspect of our wonderful India.

Across its northern frontier are the awe-inspiring mountains called the Himalayas, or "The Home of the Snows". From Kashmir to the frontiers of China stretch these colossal mountains, amongst which are the highest peaks in the world. Visitors from many parts of the Eastern and Western hemispheres think time and money well spent if they can get a glimpse of these unconquered peaks. For instance, take the view of Kanchenjunga from Darjeeling. When the clouds roll away, and there lie before us Mount Kanchenjunga and its neighbouring giants, we can sit and gaze at them for hours as if under a spell.

KANCHENJUNGA

One of the first thoughts to come to our minds will be, "How mighty and magnificent must be the Creator of such splendour." As the rising or sinking sun or moon reflect their beams on those snowy peaks, and the gorgeous colours appear and disappear, we sit oblivious of all else around us. Shimmering pink and turquoise, slowly deepening into rose and blue until the snows seem to be bathed in rich red and gold. Only the Almighty Artist could paint such a picture.

What an ideal place for meditation! The religious recluses of old certainly knew what they were doing when they retired to the Himalayas for the contemplation of the Eternal!

Having tried to understand the message of the mountains, our next thought will be one of pride that these world-famous wonders are in our own land of India. The Himalayas serve a very practical purpose. Not only do they help to keep India free of invaders, but they keep the Northern plains well supplied with plenty of life-giving water. The mighty river Ganges, Indus, Sutlej, and Brahmaputra all have their source in the Himalayas.

Then let us consider the fame which the mountains have brought to many intrepid adventurers who have tried to climb some of their peaks—Mount Everest, Kanchenjunga, and Nanda Devi. These expeditions, although well-planned, have generally ended in dis-

aster. Still, such is the adventurous spirit in man that there will always be found some brave ones who are willing to risk their lives in the cause of science and exploration. Many expeditions have tried to climb Mount Everest. All have failed, and many valuable lives, both Indian and European, have been lost.

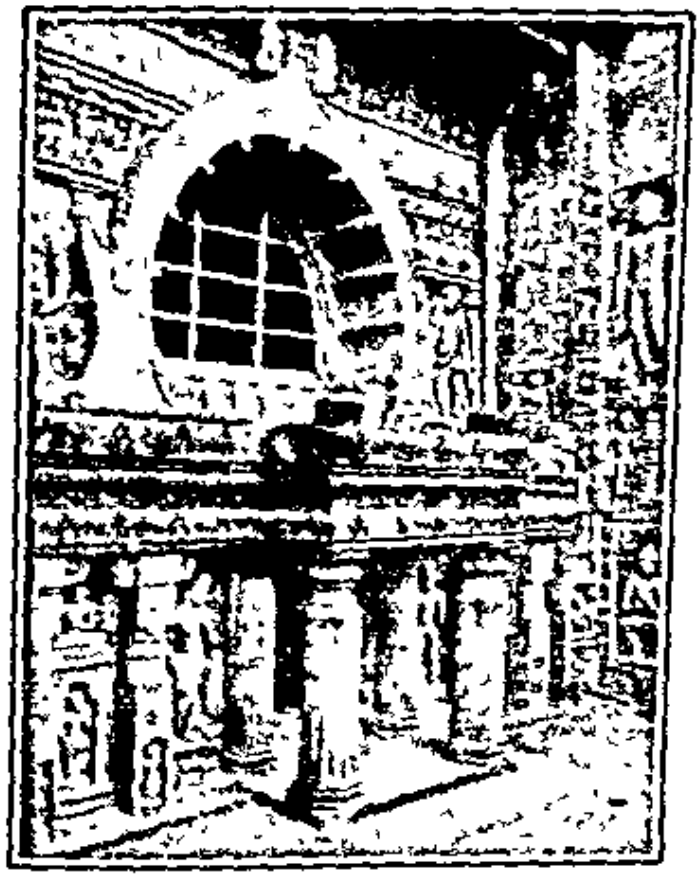
Everest, however, has been conquered from *the air*. In 1933 Lord Clydesdale, after months of preparation, flew completely over the highest mountain in the world

FLYING OVER MT EVEREST

with only a few feet between his plane and the summit. He and his companion were only able to survive the ordeal by breathing oxgyen which they took with them in specially warmed containers. Wonderful photographs of Mount Everest were obtained, but whilst taking them the photographer's apparatus for breathing the life-giving oxygen became unfixed, and his life was in great peril. Fortunately he was able to readjust the apparatus just in time. Having flown over the top of Everest, you can imagine with what excitement the brave fliers returned to their base. The next morning the world read the news of how Mount Everest, unconquered from the land, had been conquered from the air.

The next wonders for our consideration are the Ajanta Caves. About 250 miles from Bombay by rail is a place called Jalgaon, and nearly forty miles further on, by road, we shall find the Ajanta Caves. They are one of the most remarkable sights of India. The caves were excavated out of the rock by the Buddhists. Although they date from 200 B.C. they were not generally known until A.D. 1819. There are twenty-nine caves in all, some large and some small. Nearly all their walls are covered with wonderful frescoes or paintings which have been restored to their original colours. Here are fully set out many chapters from the life of Buddha. The scenes of sickness, old age and death, which led Buddha to renounce

world, are vividly depicted. Other famous pictures are of a "black princess," a royal procession with elephants, horses, and armed retainers, a sailing boat fitted with jars, the Birth of Buddha, and the Temptation of Buddha by Mara.



AJANTA CAVE NO. 9

There are also sculptures representing other stages in Buddha's life. All these are carved from the solid rock. Many caves consist of galleries of cells in which the monks used to live. There must have been a number of such communities who conducted worship at

fixed times during the day and spent the rest of their time in meditation and prayer, or in painting and sculpture.

When the great gong of the Vihara or monastery sounded, you can picture to yourself the monks leaving their cells and going in procession, two and two, in their saffron-coloured robes, to the nearest Chaitya hall or temple. Each monk would occupy his own special stall or seat and await the arrival of the Abbot or head of the community, who would conduct the worship of God at the altar of Buddha. Many brass oil lamps would be set out on the altar, their tiny lights glittering in the semi-darkness. Flowers and other offerings found their proper place on the altar, and incense was burnt. Then all those assembled would begin to chant the Buddhist scriptures. It must have been a wonderful scene.

Let us now leave Ajanta and its monks and search for the next wonder to be studied.

We have not to search far, as some of my young readers have already hinted to me that they think it is about time we went to the Taj Mahal. Well, let us go to Agra, that dusty city on the edge of the Rajputana Desert.

The Emperor Shahjehan built many fine buildings in and around Agra Fort. The Dewan-i-Am, the Diwan-i-Khas, the Pearl Mosque, the Machi Bhawan, the Sish Mahal, and the Jami Masjid are all delig'

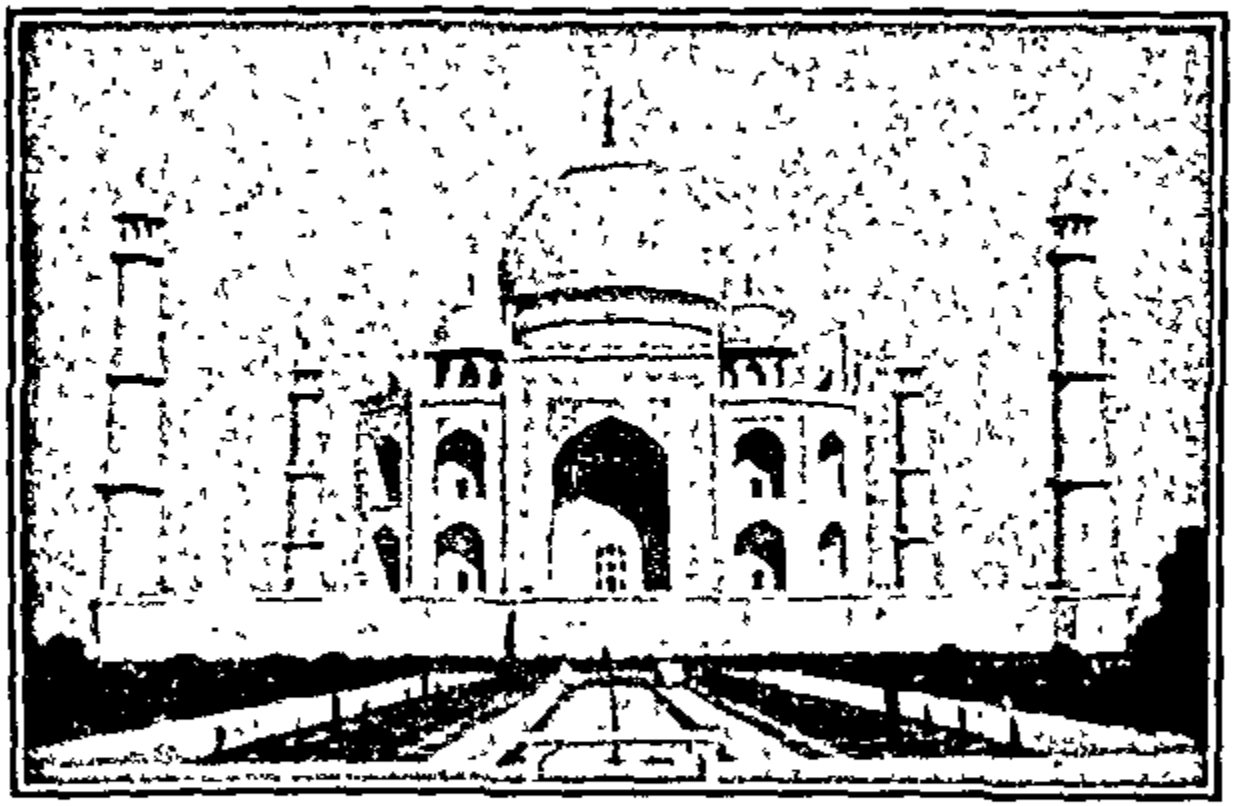
to look at. But Shahjehan excelled even his own excellent taste in art and beauty when his mind conceived the idea of erecting the Taj Mahal to the memory of his beloved wife, Mumtaz Mahal. The work was commenced in 1630, and it took twenty-two years to complete. You know, of course, that the Taj Mahal is a tomb and covers the grave of Mumtaz Mahal. After reigning for thirty-one years, Shahjehan died in 1666, and was buried by the side of his queen in the vault of the Taj.

Now we have just read that the Taj Mahal is a tomb, and we must, therefore, conduct ourselves with due reverence and respect whilst we are in its precincts. In fact, as soon as we begin to approach the lovely court-yards and gardens which surround the Taj, we feel a certain religious atmosphere stealing over us, making us more quiet and reserved than we naturally are.

The great gateway to the garden is built of red sandstone, inlaid with ornaments and inscriptions from the Koran in white marble, and surmounted by twenty-six white marble minarets or umbrella-like structures. On entering the gateway we are surprised at its height and size. It is like a very spacious hall. If one should go at night, then the scene is much more impressive. The interior is illuminated by the soft light from a huge brass lamp which hangs from the centre of the ceiling As the lamp is beautifully

carved, the rays of light penetrate through its innumerable openings, and give a very pleasing and softening reflection on the walls and roof of the hall.

However, let us pass on. Through the ever-open archway we see, at the far end of the long garden, the beautiful white building which we, from somewhere in India, have come to visit. The remarkable



THE TAJ MAHAL, AGRA

thing is that no one can gaze upon the Taj Mahal and remain unmoved at the sight.

Whether it be the story of faithful love behind its building, or the glorious way in which the huge mass of marble seems to float in the air before one's eyes, or the wonderful symmetry of the central dome and it-

minarets, or the tall minarets at the four corners of the platform on which the tomb rests, or the perfectly designed decorations, which have been carved over its entire area, there is always something which impresses the visitor and remains with him as long as he lives.

The people who are ascending the platform for a closer view of the building look like midgets as they walk about. We, in our turn, become similar midgets to the newcomers just entering the long gardens. We ascend the stairs and enter the doorway of the Taj. Behind a wonderful marble screen lie the ceremonial graves of the king and queen. A sense of great solemnity seems to pervade the air, and there is also the scent of jasmine flowers as some visitors drop on the tombs a few petals of the lovely little white flower.

The long-bearded attendant then favours us with a remarkable demonstration. He cups his lips with his hands and in a loud voice utters a few words in praise of God. To our amazement the voice continues to echo for a long time round and round the dome above us, gradually fading away. It is not only very impressive, but also denotes that the dome above is a perfect specimen of the builder's art.

We are now about to go down into the vault in which Shahjehan and Mumtaz Mahal are buried. If any of you are rather nervous, then stay at the top with the other visitors, but I would advise you not to miss

the sight we are going to see. Down the steps we go into the darkness. Then, suddenly, we see the two graves, side by side. All is silent and peaceful here. We are now in the royal presence, as it were. We are at Court ! But the king and his queen have already passed on to a place to which everybody is bound to go in due course. Here face to face with the royal graves we learn our lesson of the uncertainty of life and earthly riches and thrones. Before the summons comes for us, we must show the world what we are made of, and give a good account of ourselves.

Let us go upstairs now, and find a quiet corner in the beautiful grounds, and have some of the refreshments which our kind hosts in the city have sent for us. For, all said and done, sightseeing is hot and tiring work. When we have refreshed ourselves we shall be better able to assimilate the lessons we should have learnt at the Taj Mahal.

The gardens in which we are sitting are very lovely and soothing to our minds. Whilst we are in such peaceful surroundings, why should we not study our last and modern wonder of India ? I refer to Jamshedpur or Tatanagar, the hive of industry of the Tata Iron and Steel Works. Now, it is rather a big jump from the mediaeval Taj Mahal to the ultra-modern steel works of Tata's, but I do not think there is much else for us to consider in the time at our disposal.

THE TATA IRON & STEEL WORKS, TATANAGAR

The town is about 150 miles from Calcutta, and consists of Iron and Steel Works and the houses built for the workmen who work in the factories. In 1909 only a few hundred people lived there, but now there are over 160,000 inhabitants.

If we approached Tatanagar at night we should soon be aware that something very unusual was near at hand. There is a powerful red glow in the sky, and soon rows and rows of lamps reveal hundreds of well-built roads and houses. Over in the distance are the huge furnaces which work night and day in order to produce tons and tons of bright tough steel. Now and then there is an occasional spurt of flame around the furnaces as the doors are opened for a moment. All sorts of things are made at Tatanagar. Tin plates, agricultural implements, parts of locomotives, jute machinery, girders for bridges, armour-plate for the ships of the Royal Indian Navy, and innumerable other things are quickly manufactured and sent to their destinations. Ninety per cent of the steel used in the new Howrah Bridge at Calcutta was made at Tatanagar by Indian labour. The Steel Works are the largest in India. In Tata's Iron and Steel Works, the world pays tribute to Indian industry and India's workers. Twenty-five years ago, it was a very small and unimportant concern. To-day it is providing steel and iron in abundance to those who want metals, especially bridge-builders, and ship-bui

This concludes our studies of the Wonders of India. There are many more wonders than what we have dealt with, but we have not the time to study more. But even the little we have learnt should make us very proud of India.

Why should we be proud of India ? It is our country, our Motherland. The vast sub-continent of India, with nearly three hundred millions of people, has always been prominent in world history. From the earliest times there has been a continual flow of different peoples and tribes into our country, and most of them have retained the characteristics of their nation or tribe even down to the present day. The fact is that the people of India consist of a number of individual races with distinct histories, customs, and even facial features.

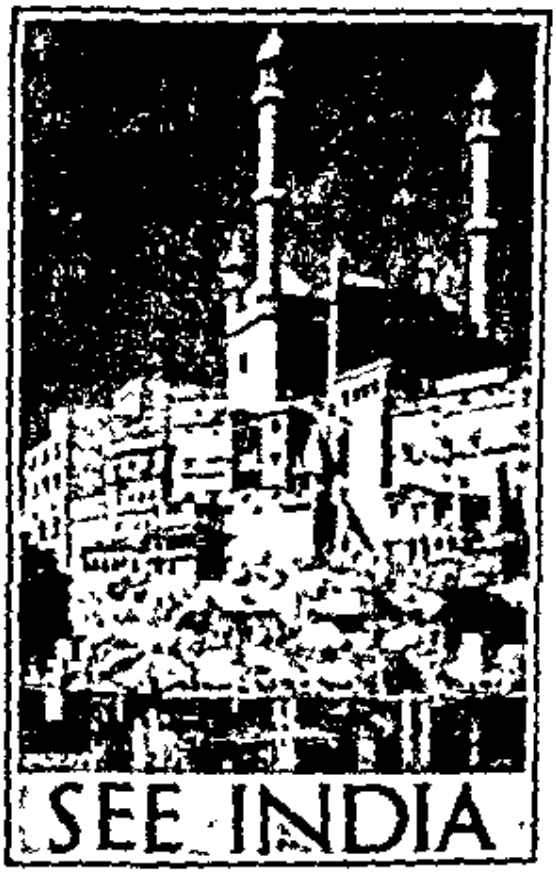
In order to understand this better let us take the Island of Britain as an example. Its inhabitants are divided into three distinct nations, the English, the Scots, and the Welsh. They are proud of their individual histories, customs, and language.

In India we have the Bengali nation, the Maratha nation, the Rajputs, the Gujaratis, the peoples of Madras, those of the Ganges Valley, and many others, each with their proud histories, customs, and special characteristics. There can be no gainsaying the fact that when a Bengali visits another part of India,

especially the South, he at once feels homesick and out of place. The language is new to him, the people have their own customs, and they eat and drink different kinds of food and beverages from what he has been accustomed to. The same can be said about practically every province of India.

Now, how can this state of affairs be remedied so as to make us "All-India minded"? More travel and a greater knowledge of our inheritance is surely the best and quickest way of understanding the idea of a national India. If we read the proceedings of our Indian Parliament in Delhi we shall soon understand what the unity of our country stands for

Since the inauguration of the popular "School Excursion," many students have travelled afar. In fact some schools have embarked upon regular "voyages of discovery." Under the able direction of their teachers, the students have gazed with wonder on many world-famous scenes in their own Motherland, and they have understood their history and geography lessons far better on resuming their studies after the excursion. It is certainly a sure means of broadening our minds, and helps to make us sympathetic towards our fellow-countrymen, some of whom were complete strangers to us before. Although the particular histories of our different peoples are proud records of the past, it is well to let them be of the



[By courtesy of the Indian State Railways

and not allow them to intrude themselves too much upon the present.

Let our young men and women become Indians in the true sense of the word, and not provincials. There is nothing in this world which we cannot get used to. If our friends living in Madras prefer coffee to tea, then let us at least *taste* coffee and try to acquire a liking for it. If our friends living in Bengal prefer tea to coffee, let their Madras friends cultivate a liking for an occasional cup of tea. Do not let us boast that because we belong to a particular province we would rather die than eat or drink the favourite food or beverages of our countrymen in other provinces. Then, if we can show a united front about such little things, we shall be able to face the world united in our aims and objects. We shall create a United India in the real sense of the term.

Education is one of the best ways of helping all our countrymen to reach this goal. We must also try and

INDIAN ARTILLERY
A Gun Crew at Drill.

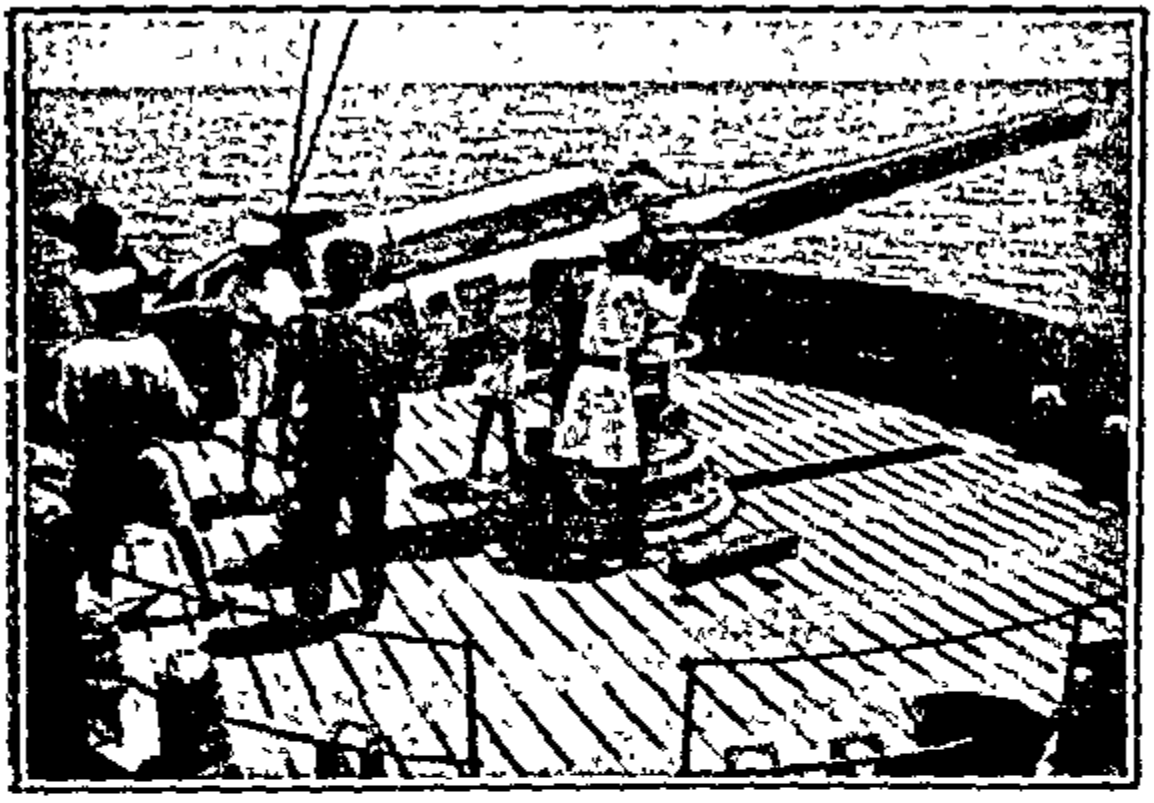
use a language which is understood throughout our land, let it be Hindi or whatever you will. That will be one of the surest weapons to defeat provincialism. Moreover, many people are inclined to believe that provincialism fosters communalism. Now, all students should know that communalism is a very serious affliction, a hoary-headed monster which is eating right into the heart of India. Its victims can be numbered in thousands. It causes very bad feelings betwen different communities, and results in fighting and killing. Pandit Jawaharlal Nehru, addressing a vast assembly of 500,000 people at Bangalore in December 1948 said, "In India communalism has

wrought havoc ; the country is to-day full of poison, pitting community against community, so we have decided not to tolerate communalism any more."

Let us always have kindly feelings towards all our fellow-citizens, of whatever religion or community they may be. In fact India's new constitution provides for the equality of all and no discrimination against minorities or any religion If every student takes these lessons to heart, the future of our country will be assured, and its wonderful history will be perpetuated for all time.

We have read about the wonders of our country,

THE INDIAN AIR FORCE
Two pupil officers with "thumbs up."



THE INDIAN NAVY
Men of a Minesweeper with a breech-loading gun.

and we know why we should be proud of them. We must, therefore, make up our minds how we are going to help our country after we have finished our studies.

Many roads are open to us. We can join one or other of the Services, that is, the Army, the Navy, or the Air Force, and learn how to defend our country against any enemy.

As many young men as possible should join one or other of these health-giving occupations. The Services offer us adventure, travel, and education, and the honour of defending India on sea and land. Although we cannot expect to jump into a job at the top of the ladder, there are ample opportunities to

rise to great heights by conscientiously carrying out one's duties.

If, however, the Services do not appeal to you there are many other walks in life. You can follow the profession of your father, who may be a lawyer, a doctor, a teacher, or of any of the other professions.

LADY TELEPHONE OPERATORS

There are many opportunities for girl students as well. The question of your future employment is one of vital interest to yourself and your parents, and as it is a matter which should be decided, if possible, before you leave school, it is suggested that you go through the list of professions, etc., which you will find at the

end of this book, and mark the particular profession you would like to take up When you have done this, cut out the page carefully, put it in an envelope, address it to your parents, and give it to them when you go home.

All parents are anxious to help their sons and daughters to come to a right decision regarding the future, so do not be afraid they will be angry with you. On the contrary, they will be very pleased, and India, the land of wonders, will be proud of you in due time.

QUESTIONS

1. Do you know of any other place in Northern India or Pakistan where an ancient city has been discovered ?
2. Give the names of other hill stations from which the Himalayas are visible.
3. Can you suggest why the Ajanta Caves should have remained hidden for so many years ?
4. Give the names of the countries where Buddhism is powerful at the present day.
5. The Taj Mahal has become the most famous building of the world. Give the reason for this.
6. Write an essay on steel and its uses.
7. What is provincialism ? Should it be encouraged or condemned ? Give your reasons.
8. Describe communalism and its dangers.
9. What do you intend to do for your Motherland ?

NOTES

manhole : a hole big enough for a man to pass through to inspect sewers, drains, etc.

waterchute : a slide or pipe down which water can flow from a higher to a lower level.

romantic : picturesque ; imaginative.

rapturous : spellbound or engrossed.

spell : a charm.

turquoise : a gem with a bluish or greenish blue colour. Many turquoises are found in India and Tibet.

recluses : those who lead a solitary or secluded life.

eternal : without beginning and without end ; everlasting.

intrepid : daring ; bold ; fearless.

frescoes : paintings in water colour on plaster or rock.

depict : to represent by a picture or to describe in words.

Mara : the Prince of Darkness.

meditation : contemplation ; pondering over.

saffron : a plant yielding a deep yellow dye.

scriptures : sacred writings.

precincts : an enclosed space ; a place with certain limits.

symmetry : the harmonious balancing of the several parts of any building, etc.

midgets : small persons ; dwarfs.

cups his lips : puts his two clasped hands to his lips so that he can speak or shout through his hands as though through a trumpet.

hoary-headed monster : hoary-head :—a head covered with white hair denotes old age ; monster :—a frightful creature of great size. Hence this term applied to communalism signifies that it is no new thing, a very old and frightful curse upon humanity.

perpetuated : made to endure ; to go on for ever.